FEBRUARY 25, 1922

THE RUBBER AGE

VOL. X. NO. 10

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THE RUBBER AGE

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GENERAL MANAGER

W. I. SEAMAN
TREASURER

VOL. X FEBRUARY 25, 1922 No. 10

Third Annual Banquet of the Mid-West Rubber Association

THE Mid-West Rubber crowd may not number so many as their effete Eastern brethren, but you must hand it to them for knowing how to run a bang-up good time. They not only do it once a year at their annual banquet, but they do it twelve times a year at their monthly meetings, so that the spirit of good fellowship is always kept alive in the trade—that is why the Mid-West Rubber Manufacturers Association is a vital, forceful organization performing a distinct and valuable work in its own sphere.

Their third annual meeting and banquet at the Hotel Morrison, Chicago, on Tuesday evening January 31 was no exception in respect to interest and a good time to the two that had gone before. The annual meeting was held after the noontime luncheon, and the banquet in the evening.

An innovation this year was the change of the time of the annual meeting and banquet to the latter part of January so that it would come during the Chicago Automobile Show. This will unquestionably accommodate many who will desire to attend this show, and, it is thought, will bring out a considerably larger attendance in the future.

The main event, as usual, was the banquet in the evening. All was in readiness by 7 o'clock and the guests took their places to the strains of orchestral music. The tables were arranged about three sides of a square, leaving an open space in the middle where the entertainers later displayed their talents. This was another innovation, as formerly when the somewhat riotously inclined daneers circulated about among the guests seated at small tables *à la cabaret*, there were some antics which the long, severely placed tables, serving as a kind of rampart, entirely obviated. Now, some liked this new arrangement, and some did not. We refrain from mentioning names but will only remark that polished domes and silver locks alike, as well as portly waist coats, were entirely neglected by those gay and festive creatures whose blithesome mirth was specially provided for the guests to regale themselves withal. We believe the small round tables will be back next year.

But if ramparts had been erected against Venus, what shall we say of Bacchus! We all know of the glorious work of that great Minnesotan, Mr. Volstead, who so nobly protects us all from the grape and the prune. Whence then came the spontaneous gayety at this feast! To the everlasting credit of the Mid-West be it said that the great Mr. Volstead's own pet Act does not dry up the well-springs of its ancient, joyous good nature.

WILLIAM W. WUCHTER, RE-ELECTED PRESIDENT

General Manager and treasurer of the Nebraska Tire & Rubber Co., Omaha, Nebr. One of the best known men in the industry and deservedly popular. A thorough rubber manufacturer, trained in the Goodrich and Firestone schools in Akron, he organized the Nebraska Tire & Rubber Co. four or five years ago and has made a distinct success of it from the beginning.

Everybody at this banquet was just naturally so glad to be there and to have the consciousness that his own particular tire factory was still open and ready for orders and had not succumbed to hideous inventories of tire fabric and crude rubber (even as some of the Big Brothers), that good spirits just could not help overflowing all around that festive board. And that's how they beat Mr. Volstead!

Most of the serious business of the convention had been attended to in the afternoon when E. S. Babcox of the *India Rubber Review* of Akron talked on the trade outlook.

At the evening banquet President Wuchter introduced Homer Buckley of the Buckley-Dement Co., the well known advertising agency of Chicago, who made some interesting remarks on transportation and advertising problems. Then the fun began. Nora Bayne sang snappy songs and then she had to sing some more. Gertrude Carolton said she was "a little bathing girl." We are inclined to believe Gertrude, even though no water was handy. Cleo Pearl Fell was on the program as a "character dancer." Her character seemed to be all right, and Mary Jane as a soubrette ran true to form. But when it came to that Tracy girl—Claudia Tracy whose home town is somewhere out in Iowa—why, that is where the Christie brothers, Gabeline and the rest of those Iowa fellows were right at home. Claudia sang a new song entitled "I-ow-A," and Jack Christy stepped right forward and helped her out with it. To borrow a phrase from our esteemed contemporaries, the singing of the song "I-ow-A" by all present led by Miss Tracy and Mr. Christie was one of the happiest and most entertaining features of the evening. Be it said to the honor of Claudia that though caught in the maelstrom of Chicago, she still remembered her old Iowa home. It was all quite affecting.

Then after Claudia and Jack came Nettie MacPherson who played Scotch bagpipes and danced the Highland Fling. Now Miss MacPherson is one of the MacPhersons of County Galloway, Scotland, and she learned to dance the Highland Fling where the art of Highland flinging has not yet been lost, any more than has that smoky taste of Usher's Old Vatted Glenlivet. (Oh, memories of former days). She had the true flavor or Auld Reekie, and everybody thought she was just about right.

Then just to show the girls that the Mid-West bunch were no "dead ones," Messrs Bruner of the General Electric Co. and Read of Forney & Co. assisted by a real colleen from Limerick sang "My Wild Irish Rose." As they sang this

appealing ballad they marched and countermarched in the space which had been so safely fenced off by the ramparted tables. All agreed that the wild Irish rose of this trio was a real beauty and must have been grown on the far-famed Cruiskeen Lawn.

Last of all came Mlle Gonzalos in what was called a Sheik dance. Ever since we read that highly flavored book entitled "The Sheik" we have been somewhat worried about the dancing that goes on in these 'ere sandy deserts. Mlle. Gonzalos' name sounds like Spanish, but she must have studied her art in the streets of Cairo or some place thereabouts where sheiks are wont to frequent. We venture to opine that the most fastidious sheiks would have complimented her performance, even as did these sheiks gathered at their own private Oasis in Chicago.

This concluded the evening's entertainment and all present voted it one of the best times ever given under the auspices of Mid-West. No little credit for the success of the entire affair is to be given to the Banquet Committee who together with President Wuchter and General Manager Sutherland had charge of all the arrangements. The Banquet Committee was as follows: C. C. Christie, of Des Moines, Chairman; W. E. Wilson of Akron; E. T. Meyer of Chicago; P. P. Parker of Indianapolis; A. C. Eide of Chicago; J. B. Longini of Chicago; J. Tumpeer of Chicago.

THOMAS FOLLEN, FIRST VICE PRESIDENT AND DIRECTOR

President and General Manager of the Lion Tire & Rubber Co., La Fayette, Ind. which he organized in 1916 after having disposed of his interests in the coal business. The Lion cord and fabric tires have achieved a reputation for quality products.

At the annual meeting held in the afternoon the following officers for the ensuing year were elected:

President

W. W. Wuchter, General Manager, Nebraska Tire & Rubber Co., Omaha, Neb.

First Vice President

Thomas Follen, President, Lion Tire & Rubber Co., La Fayette, Ind.

Second Vice President and Treasurer

Sam J. Turnes, Adv. Manager, Brunswick-Balke Collender Co., Chicago, Ill.

Secretary and General Manager

Charles S. Sutherland, 607 So. Wabash Ave., Chicago, Ill.

Directors

Terms Expire 1925

Sydney J. Roy, General Manager, Hannibal Rubber Co., Hannibal, Mo.

Walter R. Denman, General Manager, Denman-Myers Cord Tire Co., Warren, Ohio

E. H. Bohlmann, Factory Manager, Cupples Co., St. Louis, Mo.

J. B. Gabeline, President, Standard-Four, Tire Co., Keokuk, Iowa

The other directors are as follows:

Terms Expire 1924

Sam J. Turnes, Adv. Manager, Brunswick-Balke Collender Co., Chicago, Ill.

W. W. Wuchter, General Manager, Nebraska Tire & Rubber Co., Omaha Neb.

D. M. Mason, General Manager Mason Tire & Rubber Co., Kent, Ohio

Paul P. Parker, President, Parker Tire & Rubber Co., Indianapolis, Ind.

Terms Expire 1923

Thomas Follen, President, Lion Tire & Rubber Co., La Fayette, Ind.

M. J. Flynn, Treasurer, Inland Tire & Rubber Co., Chicago, Ill.

Harry J. Smith, President, Achilles Rubber & Tire Co., Binghamton, N. Y.

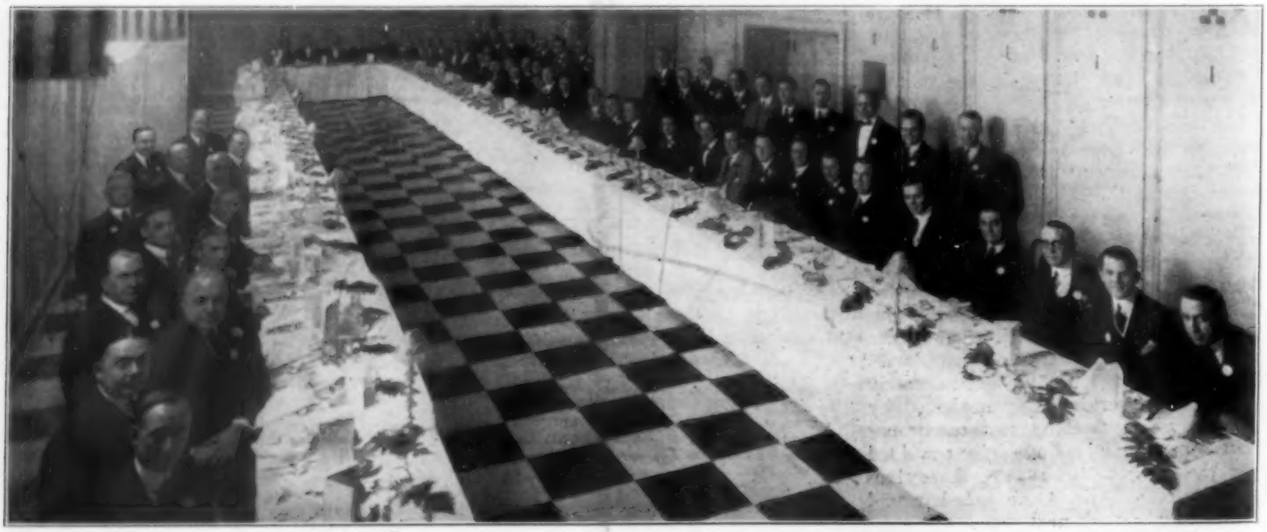
D. L. Spraker, Kokomo Rubber Co. Kokomo, Ind.

Ex-officio members of the Board for three years as Ex-Presidents of the Association

John W. Maguire, President, Maguire Tire & Rubber Co., Cleveland, Ohio

John T. Christie, President, Hawkeye Tire & Rubber Co. Des Moines, Iowa

D. M. Mason, General Manager, Mason Tire & Rubber Co., Kent, Ohio



THIRD ANNUAL DINNER OF THE MID-WEST RUBBER MANUFACTURERS' ASSOCIATION AT THE HOTEL MORRISON, CHICAGO, JANUARY 31

Those at the head of the table from left to right: John T. Christie, president of the Hawkeye Tire & Rubber Co., Des Moines, Iowa, former president of the Association; E. S. Babcox of Akron; William W. Wuchter, president of the Association, general manager of the Nebraska Tire & Rubber Co., of Omaha, Nebr.; Homer Buckley of Chicago, speaker; Thomas Follen, president of the Lion Tire & Rubber Co., La Fayette, Ind., first vice president of the Association; Sam. J. Turnes, general advertising manager of the Brunswick-Balke-Collender Co., Chicago, second vice president and treasurer of the Association. C. C. Christie, Chairman of the Banquet Committee at the right end of table.

D. L. SPRAKER, DIRECTOR

One of the executives of the Kokomo Rubber Co., Kokomo, Ind. Mr. Spraker is a native of Indiana, and started his business career with the Kokomo Rubber Co. in 1897, and has been with it continuously ever since, a period of 24 years—some distinction in the tire industry.

HARRY J. SMITH, DIRECTOR

President, Achilles Tire & Rubber Co., Binghampton, N. Y., well-known in the rubber industry as a manufacturer of long and successful experience. His company was established in 1916, and makes both passenger car and truck tires.

SAM J. TURNES, TREASURER, SECOND VICE PRESIDENT

General Advertising Manager of the Brunswick-Balke-Collender Co., Chicago. He was formerly manager of the tire sales division of this company and before that was in the wholesale piano and phonograph business. He is one of the live wires of the Mid-West organization.

J. B. GABELINE, DIRECTOR

President and General Manager of the Standard Four Tire Co., Keokuk, Iowa

WALTER R. DENMAN, DIRECTOR

General Manager of the Denman-Myers Cord Tire Co., Warren, Ohio. In company with W. E. Myers he organized the Denman-Myers Cord Tire Co. in 1920, and they have an exceptionally well-equipped plant in operation at Warren.

PAUL P. PARKER, DIRECTOR

President and General Manager of the Parker Tire & Rubber Co., Indianapolis. Young in years but old in service. Although only 31 years of age he has been in the rubber industry since 1909 when he started with Swinehart in Akron. Later he was with Knight and Besaw at Canton and three years ago established his own company at Indianapolis. He has built a model plant where he manufactures only high grade cord tires.

The following Finance Committee was appointed: Sam J. Turnes, Thomas Follen and Sydney J. Roy.

The DuBois Rubber & Tire Co., Chattanooga, Tenn., was elected to Regular membership and the New Haven Sherardizing Co., Hartford, Conn., to Associate membership.

President Wuchter reported encouragingly on the state of the Association and the outlook for the future and urged all present to take an active interest in increasing the membership.

The following is the list of those present at the luncheon in the afternoon and the banquet in the evening:

Edward S. Babcock, *India Rubber Review*, Akron; Milton Birkenstein, S. Birkenstein & Son, Co., Chicago; R. A. Blanchard, American Zinc, Lead & Smelting Co., St. Louis; E. H. Bohlmann, Cupples Co., St. Louis; Theo. Bohlmann, Cupples Co., St. Louis; F. A. Bonstedt, Pell & Dumont, New York; P. A. Bloom, Fred Stern & Co., Inc., Akron; G. E. Bovis, McGraw Tire & Rubber Co., East Palestine, Ohio; E. W. Bowman, National Aniline & Chemical Co., Akron; W. C. Brown, The Consulting Co., Cincinnati; C. A. Bruner, General Electric Co., Chicago; Homer Buckley, Buckley Dement & Co., Chicago; C. C. Christie, Hawkeye Tire & Rubber Co., Des Moines, Ia.; R. G. Conant, Brighton Mills, Passaic, N. J.; D. J. Daly, Brighton Mills, Passaic, N. J.; C. A. Dewberry, Marlboro Cotton Mills, McColl, S. C.; A. C. Eide, American Zinc Sales Co., Chicago; R. W. Fahey, Perfection Tire & Rubber Co., Fort Madison, Ia.; Thomas Follen, Lion Tire & Rubber Co., La Fayette, Ind., J. B. Felsenthal, S. Berkenstein & Son Co., Chicago; John Frederick, Hawkeye Tire & Rubber Co., Des Moines, Ia.; W. W. Garrison, McJunkin Advertising Co., Chicago; Geo. Gekie, Brighton Mills, Passaic, N. J.; Ed. G. Gereke, Gereke-Allen Carton Co., St. Louis; R. J. Grant, Parker Tire & Rubber Co., Indianapolis; L. G. Grant, Akron Rubber Mold & Machine Co., Akron; C. E. Gilson, Eagle Picher Lead Co., Chicago; W. F. Harrah, National-Standard Co., Niles, Mich.; D. C. Hathway, McGraw Tire & Rubber Co., East Palestine, Ohio; Roger Hayes, Gereke-Allen, Carton Co., St. Louis; C. B. Hextell, Hawkeye Tire & Rubber Co., Des Moines, Ia.; H. C. Johnston, McGraw Tire & Rubber Co., East Palestine, Ohio; H. W. Jordan, Montgomery Ward & Co., Chicago; I. Keingsberg, Parker Tire & Rubber Co., Indianapolis.

CHARLES S. SUTHERLAND, GENERAL MANAGER AND SECRETARY

He joined the Mid-West Association in April, 1920, having formerly been with the Rubber Association of America in New York.

Scott Kingwell, *Tires*, Chicago; Harvey D. Kline, Grand Rapids Rubber & Tire Co., Grand Rapids, Mich.; F. W. Knoke, American Zinc Sales Co., Chicago; Edward Kolb, Eagle Picher Lead Co., Chicago; L. N. LePan, C. T. Wilson Co., Akron; J. B. Longini, The Pittsburgh Valve, Foundry & Construction Company, Chicago; S. W. Lowry, Century Rubber Works, Chicago; J. Matthias, Jr., Mineral Point Zinc Co., Chicago; E. J. Maurer, Edw. Maurer & Co., New York; H. A. Mac Kusick, Philadelphia Rubber Works, Philadelphia; E. C. Merkle, Parker Tire & Rubber Co., Indianapolis; E. T. Meyer, F. R. Henderson & Co., Chicago; Chas. Muehlstein, H. Muehlstein & Co., Chicago; R. F. O'Malley, Perfection Tire & Rubber Co., Fort Madison, Ia.; Paul P. Parker, Parker Tire & Rubber Co., Indianapolis; W. H. Parkin, National Standard Co., Niles, Mich.; F. H. Pough, Southern Acid & Sulphur Co., St. Louis; C. M. Puhlman, J. H. Lane & Co., Chicago; H. W. Ramsay, Cupples Co., St. Louis; Roy Ramsay, H. Muehlstein & Co., Chicago; C. P. Read, Forney Co., Chicago; A. W. Reid, Cabarrus Cotton Mills, Chicago; Sydney J. Roy, Hannibal Rubber Co., Hannibal, Mo.; M. W. Rozar, Bibb Manufacturing Co., Macon, Ga.

F. G. Sell, Hawkeye Tire & Rubber Co., Des Moines, Ia.; J. Sexton, Inland Tire & Rubber Co., Chicago; A. Stein, H. Muehlstein & Co., Chicago; D. L. Spraker, Kokomo Rubber Co., Kokomo, Ind.; Chas. S. Sutherland, Mid-West Rubber Manufacturers' Association, Chicago; H. B. Taylor, Eagle Picher Lead Co., Chicago; C. H. Taveniere, Chas. E. Wood, Akron; Julius Tumpeer, Wishnick-Tumpeer Chemical Co., Chicago; Sam J. Turnes, Brunswick-Balke-Collender, Chicago; Chas. J. Venn, Century Rubber Works, Chicago; H. B. Wendell, Wenstone Rubber Products Co.; Geo. Wheatley, Century Rubber Works, Chicago; C. H. Wheeler, McGraw Tire & Rubber Co., Chicago; J. E. Whigam, Nebraska Tire & Rubber Co., Omaha, Neb.; W. E. Wilson, Akron Rubber Mold & Machine Co., Akron; Robt. Wishnick, Wishnick-Tumpeer Chemical Co., Chicago; W. W. Wuchter, Nebraska Tire & Rubber Co., Omaha, Neb.; M. Woldenberg, A. Daigger & Co., Chicago; M. M. Zoller, Eagle Picher Lead Co., Chicago.

Ninety-three Manufacturers Favor New Tire Adjustment Conditions

The extent to which the recommended Standard Tire Warranty and the accompanying revision of mileage adjustment practices have met with approval by the tire manufacturing industry may be visualized with the aid of the following list of manufacturers, totaling ninety-three, who have expressed to the Rubber Association of America their approval of the recommendation.

Amazon Rubber Company
American Rubber & Tire Co.
Acme Rubber Mfg. Company
Ajax Rubber Company, Racine Div.
Ajax Rubber Company, Inc.
Armstrong Rubber Company

Beacon Tire Company
Bergougnan Rubber Corporation
Blekre Tire & Rubber Company
Braender Rubber & Tire Company
Brunswick-Balke-Collender Co.
Buckeye Rubber Products Co.

Carlisle Tire Corporation
Columbia Tire & Rubber Co.
Continental Rubber Works
Cupples Company
Converse Rubber Shoe Company

Denman-Myers Cord Tire Co.
Double Fabric Tire Company
Dunlop Tire & Rubber Corp. of America
Dural Rubber Corporation
Dryden Rubber Company

Empire Tire & Rubber Corporation

Falls Rubber Company
Federal Rubber Company
Firestone Tire & Rubber Co.
Fisk Rubber Company

Gates Rubber Company
General Tire & Rubber Company
Giant Tire & Rubber Company
Gillette Rubber Company
Globe Rubber & Tire Co.
Goodrich Co., The, B. F.
Goodyear Tire & Rubber Co.
Gordon Tire & Rubber Co.
Grow Tire Company
Gryphon Rubber & Tire Corp.

Hamilton Rubber Mfg. Co.
Hawkeye Tire & Rubber Co.
Hewitt Rubber Co.
Home Rubber Company
Hood Rubber Company
Howe Rubber Corporation

Ideal Tire & Rubber Co.
Inland Rubber Co.

Kelly-Springfield Tire Co.
Kenyon Company, C., Inc.
Keystone Rubber Mfg. Co.
Kokomo Rubber Company

Lambert Tire & Rubber Co.
Lancaster Tire & Rubber Co.
Lee Tire & Rubber Co.
Lion Tire & Rubber Corporation

Madison Tire & Rubber Co.
Marathon Company, The
Mason Tire & Rubber Co.
McLaren Rubber Company
McCreary Tire & Rubber Co.
McGraw Tire & Rubber Co.
McLean Tire & Rubber Co.
Mercer Rubber Company
Michelin Tire Company
Miller Rubber Company
Mohawk Rubber Company
Monarch Rubber Company

National Tire & Rubber Co.
Nebraska Tire & Rubber Co.
Norwalk Tire & Rubber Co.

Parker Tire & Rubber Co.
Pennsylvania Rubber Co.
Pharis Tire & Rubber Co.
Portor Rubber Company

Quaker City Rubber Co.

Racine Auto Tire & Rubber Co.
Rubber Products Co., The

Sampson Tire & Rubber Co.
Sample Rubber Company
Sprague Tire & Rubber Co.
Spreckels "Savage" Tire Co.
Standard Four Tire Company
Standard Tire Company
Star Rubber Company
Surety Tire & Rubber Co.
Swinehart Tire & Rubber Co.
Syracuse Rubber Company

Thermoid Rubber Co.
Tuscan Tire & Rubber Co.
Tyer Rubber Company

United & Globe Rubber Co.
United States Tire Co.

Victor Rubber Company
Voorhees Rubber Mfg. Co.
Vulcan Rubber Co.

Vulcanization: Past, Present and Future

By Dr. Philip Schidrowitz

WHEN I suggested the title of the paper which I have the honor of putting before you this evening, I had the intention of dealing with the subject of vulcanization mainly, if not entirely, from a chemical and scientific point of view. Although I do not propose to abandon the program originally mapped out completely, I find that some of my colleagues have—I will not say stolen my thunder—to a large extent cut away the ground from under my feet. Thus, at a recent Manchester meeting of the Institution, my friend, Dr. Pickles while complaining that every subject but the one he was dealing with—Compounding Ingredients—had been filched from him, managed in the course of his most lucid and interesting address to poach most successfully on what I had come to regard as my preserves. Then we have a forthcoming paper on accelerators by Mr. Rosenbaum, of the Hooley Hill Company, and Mr. Peachey is to deal with cold vulcanization, and his paper, I feel sure, will cover that subject pretty completely, and will include, I hope, an exhaustive summary of his own process. This preliminary digression is by way of excuse for the—as I plead, under exceptional and extenuating circumstances—unavoidable shortcomings of tonight's communication, which I fear will prove to be no more than a bare outline of a truly vast and complex subject.

The Pioneers

There is just one more "lastly" in the way of preliminaries: I do not propose to be controversial, so far as that can be avoided. I am not going to give you my opinion (for it is not worth much) as to who discovered vulcanization. At this point, I know that, if he is present, my friend Mr. Rogers, that most worthy representative of the oldest rubber firm, will turn upon me a coldly critical eye, and the distinguished and omnipotent editors of our technical journals will uplift censorious pencils—but they will be disappointed. I am going to be content with the fact that the name of the Englishman Hancock and of the American Goodyear will always be associated with the most important basic rubber trade discovery ever made, just as that of Macintosh will always be associated with the development of proofed garments, or of Parkes with cold curing, and of the late J. B. Dunlop with the pneumatic tire.

A Definition

As I am to talk about vulcanization, I suppose I ought to make an attempt to define it. A few years ago the manufacture of a suitable definition would not have involved any considerable difficulty. Most of us would probably have said that vulcanization constitutes the reaction which takes place between rubber and sulphur or a sulphur compound, having in mind a definite chemical reaction. That definition would have been based on the "little knowledge" which is, probably, a dangerous thing, for, although we still know comparatively little about the true inwardness of the chemistry and physics of vulcanization, we do at least know that it is not a simple or a definite chemical reaction. So much, at least, the study of organic accelerators has taught us. A definite chemical reaction, such as the formation from hydrogen and chlorine of hydrochloric acid, or from calcium and oxygen of quicklime, involves the combination, invariably and under all conditions, of definite weights of both constituents. Now, if we take a mixing made with (an average) rubber and sulphur only and vulcanize it, we find that approximately 100 parts of rubber will combine with 2.5 to 3 parts of sulphur before correct curing is attained. If to the same mixing we add a minute quantity—say ¼ of 1 per cent, or even less—of a violent accelerator, we find that we can obtain a fully vulcanized product, according to factory standards, with a proportion of "combined" sulphur of as little as 0.5 or even less per 100 parts of rubber. It is true that, physically and mechanically, the products will not be identical, but they are both fully cured, and the re-action, therefore, which has taken place, cannot be the same in both instances. Naturally, these phenomena open the the door to much speculation. For instance, we might suggest—as Weber suggested in regard to cold curing—that there are a series of possible rubber-sulphur compounds, each definite and corresponding to a "full" cure, but differing according to the conditions obtaining during vulcanization. Such a theory necessarily involves the assumption of polymerising or aggregating effects varying according to the nature of the catalyst or accelerator. It has, indeed, already been suggested that sulphur is merely a catalyst or polymerizing agent and that an accelerator merely exercises the same type of effect as the sulphur, but in a much higher degree, but, in reply to this theory, it may be pointed out that so far we cannot do without the sulphur, and that the accelerator alone (provided it does not, as in the case with some of the super-accelerators described by Professor Bruni, contain sulphur capable of liberation at vulcanizing temperatures) will not produce the vulcanizing effect. I prefer, therefore, to define vulcanization mainly in terms of its effects as follows:—

Vulcanization is a process involving the interaction of rubber and of sulphur (or sulphur compound) which profoundly modifies and improves the thermal and physical properties of the rubber.

Vulcanization in the Past and Present

You are, no doubt, all aware that hot curing was first discovered by Goodyear and by Hancock between the years 1839 and 1844 that "cold curing" by means of a solution of sulphur chloride was first put forward by Parkes in 1846; that subsequently the "vapor cure" (which consists in subjecting proofed materials to the vapors of sulphur chloride instead of to a solution of this substance) was later introduced, and improved by Abbott in 1878, and that in 1888 the dry heat (stove) process of Waddington was evolved. All these methods are still employed, and therefore belong to the present, as well as to the past; but many changes in development of detail have taken place since they were first introduced. Most of you are familiar with ordinary works practice, and I will, therefore, content myself with drawing your attention to some of the more curious or important points in connection with plant and processes, and their development.

The Quantity of Sulphur

An interesting point, to which very little, if any attention has been draw so far is that, at any rate until comparatively recent times, there was a wide difference of practice as between British and United States manufacturers in regard to the quantity of sulphur employed. Broadly speaking, American manufacturers worked with comparatively small quantities of sulphur, their British colleagues with comparatively large amounts. The former method, naturally, involves the use of somewhat higher curing heats and/or more of the well-known catalysts, the latter of lower temperatures and/or less in the way of accelerators, mineral or otherwise. While the advent of the organic accelerator is gradually changing conditions generally as regards curing, it is of interest to enquire as to the reasons for the divergence of practice mentioned above and to ask ourselves which is the better? I am afraid, however, that no clean cut answer is possible to either question; I have often wondered whether it might not be that, as regards aging or life of the goods, the American practice is not more suitable to their relatively dry climate, while our methods are the better in relation to our damp atmosphere. We are well aware that a dry atmosphere exercises a more deteriorating effect on rubber than a damp one. Deterioration may take on one of two forms, hardening up or the reverse, i.e, tackiness or softening. From such knowledge as is available, it seems probable that the rate of hardening is likely to be greater than that of softening at ordinary (non-tropical)

Presented before the third London meeting of the Institution of Rubber Industry on January 11 by Dr. Philip Schidrowitz, who is acknowledged as an authority in England. Reprinted from *The India-Rubber Journal*.

temperatures, and it may, in a dry climate with moderate temperatures, therefore be wiser to run the risk of the latter than of the former. I trust that there may be some discussion on this point, for I know of no direct experiments on it that are in any way exhaustive. I do know, however, that some works managers, of great experience, regard an excess of sulphur as a "good preservative." This fact, possibly, accounts for certain disastrous results which have been noted where organic accelerators have been used in mixings of the "good old kind."

Types of Vulcanizers

I am sure that nearly all of you are familiar with the ordinary steam pan, the daylight press, and the autoclave press, but there are methods of hot curing, some abandoned, some still in use, which are not so well known. These are, for instance, the various dry heat devices more or less on the principle of the Waddington stove (in which proofed cloth passes over a series of rollers in a closed, heated chamber, the time of passing the material being so regulated as to effect a cure) for garments and footwear, in which air under pressure is the heating medium; similar processes in which, instead of air, an inert gas (such as carbonic acid) is used at normal or high pressures. Then I may mention the Fowler vulcanizer, which, with a view to uniform vulcanization and the prevention of the formation of blisters, is fitted with a device for eliminating all dissolved gases from the boiler feed. Continuous processes of various types and for different purposes have been tried, and some are working well, particularly in connection with spread goods, hose, and belting. I have seen descriptions of continuous vulcanizers for wrapped or molded tires in which the tire enters a heated chamber by way of a trap, passes forward slowly, and emerges fully cured at the far end through a second trap, but I have no experience personally of them. The continuous curing of small articles, particularly of non-molded goods, represents a difficult problem. In this connection the Eddy process (described in H. C. Pearson's excellent work on "Rubber Machinery") is not without interest. According to this process two endless chains driven by sprocket wheels, pass into the vulcanizing chamber (heated by steam coils) and around a series of sprocket wheels therein. The endless chains are connected by means of cross bars with a number of perforated trays in which the goods to be cured are contained. The chains are driven at such a speed that the goods are correctly cured during their passage through the chamber.

The Vulcanization of Tires

It is not my intention to attempt, within the scope of a short paper, to describe, or even to survey, technical processes of vulcanization in general, particularly those which are well known, but where there is a relevant link between the past and the present, or the present and the future, I am, here and there, referring to points which may be of specific importance or interest. In this connection it may not be going too far to touch lightly upon the troubles which beset the tire manufacturers in the vulcanizing department, troubles which are being resolved gradually, but so far not at all over surely. To take one point only, namely, the molding of casings or complete tires. The ideal method is that of vulcanizing on a rigid metal core by external pressure, that is by forcing the molds down on the casing or tire by external pressure during vulcanization. But this method entails, particularly in one-cure tires and where a more or less complicated tread design is employed, serious practical disadvantages, namely, very great accuracy in the molds and in the "building" of the tire are required. The slightest deviation from perfect dimensions or of workmanship in the molds, the slightest error, whether it be of weight or measurement, in building the tire to be molded, will lead to a fault which may be sufficiently evident to involve scrapping, or, what is worse, a minor flaw which will cause more or less early failure of the tire in use. These difficulties led to the development of the air-bag system of *internal* pressure, in which the casing is pressed outwardly against the mold by means of an expanding air or gas container made of flexible material. In this way the mold is always completely filled but there can be no over filling, with the attendant excessive stresses, such as are liable when the metal core is employed. The system is very widely used in Ameriet, but so far has scarcely found the popularity it deserves in this country. The maindrawback of the air-bag, hitherto, has been its cost, for it will be readily understood that a rubber bag, however well compounded, will not stand more tan a certain number of cures. Quite recently expanding metal bags have been designed, which may overcome the difficulty. In the maunfacture of cord tires, I may add, the air-bag is almost essential. This single illustration will show that while we are developing new fundamental methods of vulcanizing—that is, of getting the sulphur or sulphur-containing substance to interact with the rubber—there is still room for improvement on the purely mechanical side in connection with the molding and curing system.

Control of Heat and Pressure, etc.

If we compare the present with the past, great strides have been made in regard to the control of the heat and of pressure during the cure and also of the length of the cure. We possess *practical devices* for automatically recording the temperatures and pressures throughout the process and showing when the vulcanizer was set and blown off, and we are also able automatically to adjust and control these most important factors in workshop practice. It is to be hoped, however, that manufacturers as a body will avail themselves more freely in the future than they have in the past of the devices in this connection which are at their disposal. A friend of mine, connected with a well-known tire works, related to me a conversation overheard quite recently in a curing shop, to the following effect:—

..First Operative: Bill, this 'ere pan should have come off half-an-hour ago.

Second Operative: Never mind, the — —— will come out nice and brown.

I expect they did, but that sort of thing could not have happened with automatic control and recorders about.

Just as we cannot entirely dissociate the present from the past, we are equally unable to draw any cast-iron line between certain items of theory and practice of today and those of tomorrow. But we can take stock of the present position, speculate as to its bearing on the future and finally attempt to draw a picture—in the present case, I fear, the merest sketch—of the vulcanizing shop as it may be in the age which still lies on the knees of the gods. I think it will not be taken amiss if I qualify my stock-taking by stating that no remarks of mine are to be regarded as expressing an opinion either favorable or unfavorable on any commercial process or on any potentially commercial process or method.

Direct Vulcanization with Sulphur

The majority of the methods available come under the above heading. Some of these are well known, others are more or less novel or in the experimental stage. It is, of course, possible that some of the latter are already in commercial use without the fact being generally known. The various processes or methods in this group may be sub-divided as follows:—

(1) *Ordinary Hot Cure,* using a mix containing sulphur as such. The goods may be cured.

- (a) *In Live Steam.*—In molds in chalk; wrapped; suspended; semi-cured (press or steam) in molds, and finished off in chalk or otherwise.
- (b) *In the (Ordinary Daylight) Press (Steam-Heated).*—In molds or frames; semi-cured in molds.
- (c) *In the Autoclave Press (Steam-Heated)*—In molds or frames.
- (d) *In Electrically-Heated* molds or presses.
- (e) *In Hot Air.*—Suspended or standing in or passed through the vulcanizer slowly.
- (f) *In an Atmosphere of an Inert Gas.*—As (e).
- (g) *By Solarization.*—(The sun's rays).
- (h) *Water or Oil Cures.*—The goods, in molds or wrapped, are heated beneath the surface of the liquid.

(2) *Sulphur Bath Cure.*—The goods are dipped into and maintained below the surface of molten sulphur. Excess

of sulphur is subsequently removed by means of caustic soda.

(3) *Accelerated Hot Cure.*

(a) The mix contains inorganic accelerators, such as magnesia, lime and litharge.

(b) The mix contains organic accelerators.

(c) A combination of (a) and (b).

(*Note.*—The methods used are substantially as under (1), but there must be a readjustment of *heats* as well as of time, and usually of sulphur.)

(4) *Hot Curing in Solvents.*—The mix is "dissolved" in a solvent and the solution heated in a pressure vessel by means of steam, or in a suitable container immersed below the surface of a liquid of high boiling point. (*Stevens.*)

(5) *Accelerated Curing in the Cold.*

(a) To solutions or cements of suitable composition accelerators and activators are added in sufficient quantity to produce—within a reasonable time—vulcanized jellies. (*Bedford* and others; *Peachey.*)

(b) A mix, containing an organic base capable of forming an active dithio-carbomate, is exposed to the vapors of carbon bisulphide in the cold. (*Bruni.*)

(5a) *Curing in the Cold by means of Ultra-Violet Rays.*—"Solutions" are subjected to the action of ultra-violet rays. (*Bernstein* and *Helbronner.*)

Indirect Vulcanization with Sulphur

(6) *Hot Cure.*—Accelerators containing sulphur of which sufficient is split off at curing temperatures to produce vulcanization. (*Bruni; Bedford.*)

(7) *Cold Curing by Means of Gases.*

(a) The goods are exposed alternately to SO_2 and H_2S; sulphur in *statu nascendi* is formed and brings about vulcanization. (*Peachey.*)

(b) "Solutions" containing suitable quantities of the gases (cf. 7a) are mixed. (*Peachey.*)

It is not claimed that the above is an exhaustive list, but it covers, I believe, the majority of all the comparatively well-known processes. The same qualification applies to the methods set forth below. I have only added the names of those associated with the various processes where these are comparatively new.

Curing with Substances other than Sulphur

(8) *Cold Curing with Sulphur Chloride.*—The goods are passed through or dipped in a solution of S_2Cl_2 in a suitable solvent. Or the goods are brushed over with a similar solution.

(9) *Vapor Curing with Sulphur Chloride.*—The goods are exposed, in a suitably constructed chamber, to vapors of S_2Cl_2, or more frequently to vapors of the latter somewhat diluted by the vapors of a solvent.

(10) *Curing with Selenium.* (*Boggs.*)

(11) *Curing with Benzoyl-Peroxide* and other organic oxidising agents. (*Ostromysslenski.*) (With regard to 10 and 11 it is doubtful whether the curing effect is directly comparable either with sulphur or sulphur-chloride vulcanization.)

THE FUTURE

The Ideal-Omnium Rubber Works, Ltd., A. D. 1940.—Compared with the works with which I had been familiar in the first and second decades of the nineteenth century, the exterior of the *Ideal-Omnium Rubber Works, Ltd.*, of A. D. 1940, struck me as having indeed a strange appearance. Firstly there were no chimneys. My guide, with a pitying smile, explained that there were no chimneys because they had no boilers as we knew them, and there were no boilers because no steam lines were needed. "But what," I asked, "about your mills and calenders and vulcanizers?"

"Each mill and calender," he explained, "is connected with its own small boiler; this is electrically heated and fitted with an automatic cut-out which operates when the mill or calender has attained a definite heat. Subsequently the temperature is kept steady by a stream of warm water from a central tank. The latter is heated by means of powerful electrical elements and is fitted with delicate thermostats."

"But the vulcanizers?" I hazarded.

"There is no such thing as steam curing nowadays," he replied. "The hot cure, where it is used, is run by means of hot or warm water. Our hot-curing temperatures range from 120 deg. to 160 deg. Fahrenheit.

"You see," he added, "nearly all our molded stuff is cured in an open tank, under water. The water at the proper temperature passes through the tank in a constant stream, coming from a central tank, and is pumped back from a central well. In this way an absolutely even temperature throughout the vulcanizer is obtained, and very little heat is lost. It takes a little longer, of course, to heat up the goods this way than it would with steam, but the accelerators we use render the cure a very short one anyhow, and the advantages of working in an open vessel are enormous. No danger, no time lost in blowing off, no waste steam, no trouble as regards overheating, and so on.

"But," I said, "I thought that with big stuff—solid tires and so on—accelerators were not much use because of the long rise necessary in any case."

My guide adopted a slightly derisory attitude. "Solid tires," he said; "yes, we have one or two of the old kind in the museum, but anyhow the little difficulties you experienced about goods of that kind have been overcome. You see," he added," in your day you attempted to adapt the accelerator to works practice. Today we adapt works practice to the accelerator."

"And how," I asked, "do you heat your Waddingtons?"

"Just as we circulate hot water," he replied, "so we circulate electrically-heated hot air or inert gases—where such methods are still used. But," he went on, "we generally cure proofed goods, boots and so on, by one of the cold sulphur processes. You may know of the jelly methods, the gas cure, and the—" but at this point his answer appeared for a time to be confused.

The "Ideal" Methods

While this conversation was proceeding we had entered and commenced a tour of the works. In every department some radical change was obvious. The tire-making shops, for instance, were partly fitted with curious-looking looms, partly with tire-making machines quite unlike anything I had seen.

"In your day," my guide explained, "you were troubled, when you made fabric tires, with the crown and skirt difficulty; in the case of "cords" this objection was not entirely eliminated, and it was not easy to ensure even and constant tension. Your mechanical methods were either slow or only mechanical in part. They were all very costly—compared with ours—mainly because they were so slow. Tire-making was a craft or an art, but not an exact mechanical process. I always wonder how it was that you managed to turn out such a high percentage of good tires as you did. Now, as you see, our process is a continuous one, and the actual making of a tire occupies no more than a few minutes. We are able to achieve these results because the design of our tires is symmetrical and not asymmetrical. Long fibre cotton (the staples are 6 to 8 inches) is converted into threads, the threads pass through a proofing bath, then through a drying chamber, and then on to be interwoven with threads of rubber. In this way a supple and thin but immensely strong cloth is produced, which is continually and symmetrically lapped round a collapsible core, and at the same time attached to a false rim. The core, which is of the air-bag type, is collapsed and withdrawn through the valve hole and the tire is complete."

"Do you withdraw the core before curing?" I ventured.

"No," he replied, "for certain types of tires vulcanization proceeds at the same time as the tire is being made up. For tires with patterned treads molding and curing under water is necessary, and the bag is withdrawn after this operation."

No Inner Tubes!

"I cannot see," I said, how you get your inner tube in or attach the tire to the rim."

"Inner tubes," he replied, "are things of the past. Except for the small valve opening the tire is made without a break. As for attachment, the false rim, which is part of the tire, is attached to the rim proper by a simple locking device—that's all!"

"Ideal" Curing Shops

We now passed into a shop which was noticeable for its cleanliness and silence. It contained nothing but a series of circular, well lagged tanks fitted with lifting gear and runways, and a pipe system. "Those," said my guide, "are the

hot water vulcanizers for heavy molded stuff. The molds come in along the run-ways and are then automatically seized and lifted, and lowered into the tanks. They are then locked by the internal compression gear, and the water is turned on. At the end of the cure the water is automatically turned off, pressure is released, and the goods are removed to the finishing shop by means of run-ways on the far side."

Again we passed on. I distinctly remember a very faint but characteristic smell of electioneering eggs in one shop. "Yes," said my guide, in reply to a query, "this is the rubber linoleum department. You can just see, if you look out of the window, the gas generating station and gasometers. The process, of course, is a continuous one."

To describe what I saw in the boot and shoe shops, the mechanical and surgical departments, the cable and sports shops, and so on, would occupy more time than I have at my disposal; but everywhere—even in the mill rooms with their enclosed mixers and silent gears—one saw or felt that curious absence of the characteristics of the 1920 factory—noise, steam, solvent vapors, the dust of fillers. Above all there was the evidence at every turn of electric power—electric power for heating shops and for heating mills, water, gases—electric drive for every machine, for runways—electric light for illumination and for some kinds of curing.

"Tell me," I said to my guide, "how it is that you are able to use electricity so lavishly?"

"It costs us," he replied, "about one-sixteenth of a penny per unit. On every coal field there have been erected superpower stations, costing many millions apiece; several superstations are worked by tidal power; the loss in transmission has been reduced to a minimum,"

"But the capital cost," I said, "must have been enormous; what of the consequent overhead charges?"

"Ah, yes," he replied, "but the capital cost was defrayed out of the economies effected by a drastic reduction of the income tax in 1922 . . .

* * * * *

And then I woke up.

THE DISCUSSION

Opening the discussion, the chairman said that he had been interested, gratified, amused, and entertained by the paper, and he hoped that Dr. Schidrowitz would be spared to 1940 to see the realization of his dream. The paper had been tinged with a touch of that dry humor which was one of the great Schidrowitz characteristics. He was glad to see so many gentlemen from Manchester present, who with their tremendous experience of vulcanization both in the past and present would be able usefully to contribute to the discussion.

Does Accelerated Vulcanization Damage Fabric?

Mr. Payne, referring to accelerators, said that he was chiefly interested in proofing cloth. He wondered whether the violent action of the accelerators in any way damaged the fabric? He referred, not to laboratory practice, but to manufacture in bulk.

Faults of Accelerators

Mr. Rogers said their experience of accelerators was not very great, but they found them difficult to control, possibly because of the fact that they had already a factory running with a certain plant and they dealt with the accelerator according to the plant already installed. They ought to be able to get an accelerator which they could use much in the same way as sulphur in a given compound. Another prevalent difficulty was that most of the accelerators were changeable. They wanted to be able to mix up the dough, re-mill the waste, and use it another day. What was necessary probably was "fast" acceleration. Dr. Schidrowitz had told them that the Americans used less sulphur; he did not know whether he referred to tires, but with regard to other products he did not agree. If it were so, however, he rather thought, from what he had noticed of English goods, that they lasted longer. American goods were highly finished, but they were heavy in weight, hardened almost universally, and cracking took place. He did not know whether that was because the Americans used less sulphur, or more accelerator. His experience, taking the sulphur bath, was that a piece of rubber immersed absorbed just the necessary amount of sulphur and eventually cured. He did not know of any other method by the use of which the keeping properties of rubber were so preserved. He had known rubber treated by this method which had lasted for a great number of years.

Fordyce Jones said that it was a difficult proposition to criticize Dr. Schidrowitz on the past. It was news to him that the American practice was to use less sulphur, but he thought that applied chiefly to the higher grade articles, because the cheap products, such as mats, had but a crust of sulphur. These cheap goods were more lasting, which was certainly in striking contrast to those with a fine finish. The Americans appeared to make no attempt to de-sulphurize. With regard to the author's journey into the future, he also had had a dream, but he dreamt about ten years further ahead. (Laughter.) At that time boilers were eliminated altogether. Of course, they had some other means of power, but in his short visit he had been unable to determine exactly what it was, but he believed that the power for the mills was generated by their own movement. (Laughter and applause.)

The Chairman: Is there any gentleman present who has a dream extending a little further into the future?

Dr. Stevens said he was coming back to earth again. He was glad Dr. Schidrowitz discussed the question of accelerators. He thought he was an enthusiast, as he confessed himself also to be, but he appreciated the difficulties referred to by Mr. Rogers, which, no doubt, were very real. It seemed to him, however, that some of these active accelerators with their enormous potential advantages must eventually find their way into everyday manufacturing practice. He thought that those manufacturers who were progressive enough to take the matter up and spend time on it, would in the end reap a great harvest.

Forms of Perishing

In the early part of the paper, continued Dr. Stevens, Dr. Schidrowitz had discussed the question of perishing, and said that there were two kinds of perishing, hardening and softening. As regards vulcanized rubber, he (the speaker) would be glad of some details as to softening. His experience was that perishing took place in the form of hardening unless it was brought about by some catalyst which destroyed it or broke it down. In his general experiments on perishing, what he had come across was a hardening of the rubber; it became brittle, and there was a cracking of the surface when the rubber was stretched. There was one difficulty about doing away with boilers, even if they could vulcanize at a low temperature, and that was cooling. Perhaps Dr. Schidrowitz could tell them how the man in his dream managed to cool by electricity.

The Chairman said that at the last Rubber Exhibition the name of one particular man was on everybody's lips—that name was Peachey. As he was among them that evening, probably Mr. Peachey would be able to tell them just a little more of the great discoveries that had been referred to.

S. J. Peachey thanked Dr. Schidrowitz for showing how, in 1940, his process had made good. While he was at home in the laboratory he was afraid such was not the case when confronting such a body as theirs, and he was afraid he could not add anything that was at all useful to the discussion.

When Does Vulcanization cease?

Major Smith, who apologized for the absence of Mr. Frost, called upon by the chairman to speak, enquired when the process of vulcanization actually ceased. That was a question continually put before them, particularly with regard to tires, and he would like to hear the point discussed.

Dr. Mote asked if Dr. Schidrowitz could throw any light on the necessary amount of sulphur required for perfect vulcanization. Practice varied from 4 to 10 per cent, and there appeared to be a difference of opinion as to what is the correct amount required.

The Multiplicity of Processes

Dr. Clay spoke not as a rubber expert, but as the principal of the Northern Polytechnic Institute, and said that when one thought of the long list of proceses read out by Dr. Schidrowitz of the methods now known, and how many had been discovered either by himself, Dr. Stevens, and others within the past few years, it must be realized that they were only at the beginning of the knowledge of the properties of

the wonderful substance—rubber. Even now, after all that has been done in the past, its life was a very short one—much to the delight of manufacturers. But it was actually to the advantage of manufacturers if rubber could be given a longer life. Shortly, he thought, manufacturres would realize that there was money in the scientific investigation of the subject. Money so spent was likely to be multiplied again and again. He expected to find in the author's rubber factory of the future no one who had not attended Dr. Schidrowitz's classes. He invited everyone present to attend those classes now. Additional plant, laboratories, and facilities for experiment were required to go further ahead into the unknown, and it only required additional funds to make those investigations possible.

Tempted—But Wary!

Mr. Franklin expressed his appreciation of the lecture, and referring to the author's vista of the future, thought that all the manufacturer would have to do would be to turn up at his office at 10 o'clock, and leave at 11 for the day. Everything appeared to be done by clockwork. He was not a chemist, but a small manufacturer, and in his factory were to be found all the steam, cold and vapor processes. What they had already arrived at had been achieved by rule-of-thumb methods, which in the Rubber Industry, he thought, went a long way. Manufacturers were interested in accelerators, but also very frightened. They had a certain number of old-fashioned methods, but they at least knew where they were. From time to time he saw in the Trade papers that somebody advertised a new accelerator. As they knew, manufacturers had to deal with all kinds of mixings and compounds, and found it very difficult to determine which was the most suitable accelerator for the different purposes. Another difficulty they had to contend with was that, when they put the accelerator into a mixing and there was any waste left over, they did not know what to do with it. Although from some accelerators they had had good results, an accelerator which was not adaptable for general use, he thought, would not be largely employed in the small factories.

Mr. Zorn said that although he had learned a great deal from Dr. Schidrowitz's paper, he was not capable of offering any criticism. It was very encouraging, however, to find the author and other speakers looking ahead. Personally he would have had no objection if they had looked forward to 1960. It was a good thing, he thought, to take occasional excursions into the future. As a rule Englishmen were particularly adverse to looking ahead for any length of time. Six months was generally considered quite enough. Looking ahead as far as 1940, however, was not going very far; it was barely 20 years. Things might change a little, but they would not change to the extent they then thought. Many of those present would be just the same in their habits and would do their work in much the same way. But he liked the idea of looking ahead, of planning ahead, for after all they were working for the future, and it was because of that principle he so welcomed the touch of imagination introduced into the discussion.

Accelerators Not Favored in Electric Cable Industry

Mr. Porteous referred to the durability of rubber and the question of perishing by softening or hardening. The little experience he had had in the matter had been in connection with the manufacture of electric cables. He found that cables which were distinctly under-vulcanized had a tendency to perish by softening, while those over-vulcanized perished by hardening. Probably the presence of copper, as suggested, had something to do with it. Accelerators so far were not used by his firm in cables because of the supreme importance of the durability of the product. It was necessary that they should get the same result under the same conditions, and it was equally necessary that the finished product should stand wear and tear over a long period of time. One or two years was not sufficient. Even after the lapse of ten years if a cable perished, they were told it was the cablemakers' fault.

Mr. Standring said that he had been extremely interested in the paper. Although he was not an expert on the subject, there was one accelerator, he thought, Dr. Schidrowitz had omitted to mention, an accelerator which was most necessary in the Rubber Trade. The accelerator was supplied by membership of the Institution of Rubber Industry. (Laughter and applause.)

The Lecturer's Reply to Questions

Dr. Schidrowitz, replying on the discussion, said that he had pointed out at the beginning of his paper that he was not dealing specifically with accelerators. Accelerators had been dealt with at some length by Dr. Pickles at Manchester, and they were to have a paper on the subject by Mr. Rosenbaum, of the Hooley Hill Company. He had only dealt incidentally with accelerators on speaking of works practice generally. Nevertheless he would take an opportunity of giving his views generally on a few of the points raised. (Hear, hear.) No one expected the manufacturers to use an accelerator without undertaking any experiments on aging, etc. His own experience of manufacturers in this respect was that while they were too timorous in theory, they were too venturesome in practice. First of all, they stood on the brink hesitating, then they jumped right in without any bathing suit, lifebelt, or anything else. Then they came to grief, but they really should not blame the general process of bathing, which was a very excellent thing. He would not say what accelerator they should use, or how they should use it. It was too big a question and depended too much on the various conditions. The fact that accelerators had been used in America for years past showed that American practice was six or eight years ahead of ours, and that in practically all their works mixings they used organic accelerators sufficiently proved the tremendous importance of them. Dr. Stevens agreed that they must come into their own. That they needed caution, experience, and experiment before being put on the market he (the author) agreed. He quite realized the difficulties encountered by Mr. Rogers. The number of problems encountered by a firm such as his must be enormous. Revised methods of curing were necessary, works trials had to be made, and aging experiments had to be undertaken. It was a tough proposition. In regard to tires, Mr. Rogers had raised a new bugbear—that of variability of accelerators. His (the speaker's) experience had shown, however, that accelerators, if properly used, varied remarkably little in their effect. They must be used with the proper proportion of sulphur, a minimum proportion. The life of goods made with certain accelerators he had come across was much longer than the life of those made in the old way. With regard to waste, he had in mind, when he dreamt his dream, works practice being brought up to date and so on. Manufacturers when they made stock like to draw upon it as they wished. They made stock which would last them weeks. If they wanted to remill their accelerated waste he suggested that they should only make enough stock to last them a day or two. It was really a question of reorganization. With regard to the amount of sulphur employed, he had mainly tires in mind when he wrote the paper, as was suggested. Here American mixings contained rather less sulphur than did the tires turned out in this country. He congratulated Fordyce Jones upon his particular dream, it appeared that he had discovered perpetual motion. (Laughter.) Dr. Stevens wished him to give examples of softening. He found that in connection with tires, water meter rings, and cables, and he thought that it was quite correct that as a rule softening was due to undercuring. They found, in connection with the goods which came into contact with copper, that under-curing was absolutely fatal. In other cases over-curing was fatal. Major Smith spoke of the cessation of vulcanization. Actually vulcanization never ceased. He could not give any definite figure as to the time necessary to effect the cure because that depended entirely on the conditions. In reply to Mr. Mote, who asked what was the necessary quantity of sulphur required, he could not give a decisive answer because that also depended on conditions. In the old days they used a minimum of about 4 to 5 per cent, but now with a fairly active accelerator only 2 per cent of sulphur was necessary. The question involved two distinct problems—the quantity of the sulphur with which to cure and the correctness of the cure, and the question of aging, which was a very complicated one. Very little research had been carried out on these questions; at least very little had been made public. With regard to Mr. Franklin's remarks, he had already referred more or less to accelerators. He thought

that many experiments were still necessary, but once carried out they would all wonder they had never done it before. Mr. Zorn had complained that he had not gone far enough ahead, but he (the speaker) would remind him of the great difference that had taken place in the motor and tire industry since 1900. With regard to the question of durability of cables and the effect of accelerators, he confessed he had not had much experience in that line. He was inclined to think, however, that goods cured under proper conditions ought to stand a great deal better than goods made on the old lines. He quite agreed with Mr. Standring that one of the elements necessary to make for success in the future was the Institution of Rubber Industry, and he would conclude by thanking the Institution for giving him the opportunity of reading his paper.

A vote of thanks to the author was moved by Hugo Hutton and seconded by Fordyce Jones, who remarked that they had little opportunity of meeting their chemists face to face. They had read their deliberations in the Trade journals, of course, but he was afraid very lightly, imagining the chemist to be very academical, dieting probably on bath buns and milk. Now they found one of them delving into romance, another was said to drink cocktails while a third was reputed to tell funny stories.

The vote, unanimously accorded, was briefly acknowledged by Dr. Schidrowitz.

A vote of thanks to the chair, proposed by Mr. Rogers and seconded by R. F. Smallman, concluded the proceedings.

Non-Blooming Stocks

By A. E. Friswell

It is generally admitted that they are desirable for appearance, but I wish to call attention to the frequent sacrifice of lasting quality or durability in order to secure this appearance of pristine freshness.

I think that too much stress altogether is placed upon good looks alone. Recently I was asked to supply a formula for an inner tube for automobile tires, color no object, weight no object, but the best, toughest, most lasting thing obtainable. From a very long varied experience I selected the best thing in my collection, and my client tried it out. He complained at once, "It won't do; it blooms."

So, color no object, went into the discard. Color was an object. My client had been *over-vulcanizing* his tubes in order to prevent blooming, and wondered why they did not age well.

The employment of comparatively modern organic accelerators has opened the eyes of old-time rubber men to the fact that for many years they have been using much more sulphur than was either requisite or desirable, but the use of these accelerators has also brought about a dangerous tendency to cut the amount of sulphur beyond what is safe, or to burn out by vulcanization the slight excess over what combines chemically when the point of ideal vulcanization has been reached. When it becomes definitely determined just how much sulphur *in any form* will combine chemically with different grades of rubber whether wild or cultivated, when these grades have been so classified that any two lots of any one grade will present even approximately uniform vulcanization, and subsequent chemical and physical tests, then, it will be possible to state that this lot or this grade of rubber requires for such and such a use, such and such a percentage of sulphur to effect ideal vulcanization at a given time and temperature.

I assert without fear of successful contradiction that such definite, scientific determination has not been attained and will not be attained until much more standardization work has been done in the countries of crude rubber production, and that meantime it is idle to aim for a prescription of an exact amount of vulcanization agency (accelerated or otherwise) until this fundamental initial work has been done. Chemists have done much, and will do more, but their real work must begin at the source of supply, otherwise much of their effort is blind, groping and guess-work if they aim for age resisting quality as well as temporary new attractive finish and speed of production.

Some Lots Need More Sulphur than Others

One lot of one grade of rubber for inner tubes will digest 2.75 per cent to 3 per cent sulphur and spill out none when a perfect cure is secured. Another lot of the same grade requires 3½ per cent to 4 per cent before its stomach is satisfied, and still another "finicky" lot cannot assimilate more than 2.5 per cent without acute billious indigestion, which causes the surplus sulphur to exude in the *bloom* considered so objectionable.

It is always possible to make any rubber take in more sulphur than it should for long life, by extending the cure, and when this is done, it is a *sure fact that the life of the article will be shortened.*

Furthermore, it is extremely difficult at all times, and frequently impossible to determine just when complete perfect chemical combination is effected, and at just what point to stop vulcanizing exposure. It is always safer to undercure than to overcure. It is always safer to provide too much rather than too little sulphur. It is never safe to vulcanize to the point of maximum chemical combination, i.e., if age resisting is the aim. Something should always be left for post-chemical action, for what takes place after vulcanization. The only really safe way to secure non-blooming with age resisting qualities is to allow the vulcanized goods time to throw off the safe surplus of sulphur, and then to remove it by means of a mild alkaline bath or otherwise. In this way non-blooming is not obtained at the risk of over vulcanization.

A Slight Bloom as a Lubricant

For an inner tube a slight bloom is beneficial. It serves as a lubricant and in use a lubricant (soapstone) must be employed anyway. For a variety of rubber articles, bloom must be avoided as in the case of druggists sundries for example, because both the trade and purchasers object to the shop-worn appearance of new goods if they are sulphur-coated, and such goods are disagreeable to the touch, but to carry this objection to such articles as tires and tubes is more of a fad than anything else.

In the case of articles which must resist abrasion such as tire treads, roll covers, etc., a slight sulphur deposit is a considerable aid in service. This holds good also in soles and heels although here the objection to bloom is more than a fad, because, from a sales view, they must at least approximately match, or contrast with the color of the boot or shoe.

I repeat that while it is not difficult to secure non-blooming, by keeping down the vulcanizing agency, and fully vulcanizing, so doing is attended with risk, and while many manufacturers object to any treatment subsequent to vulcanization, on the score of cost and messiness, yet such treatment is not necessarily seriously costly, in fact it is a very small matter, nor is it necessarily the messy operation which many seem to dread.

A report has been received from Berlin that the "Continental Kautschauk und Gutta-Percha A.G.," which is the largest rubber concern in Germany, has yielded to the tendencies of the times in that country and has increased its capital stock. With the decrease in the mark, almost all the industrial companies in Germany have issued large blocks of stock, and the Continental has not proven altogether resistant to the temptation. Accordingly, the stock of the company has been increased from 22 to 65 million marks.

The Packing of Plantation Rubber

By F. G. Harvey

The packing of plantation rubber is a subject of undoubted interest to every American rubber manufacurer on account of the unsatisfactory condition in which the cases often arrive at the factory after the long trip from the primary markets. We reproduce Mr. Harvey's interesting suggestions regarding the use of rubber cases from the Bulletin of the Rubber Growers' Association of London

For several years past the packing of Plantation rubber for export has been very unsatisfactory, both from the producers' point of view, by reason of the expense, and from the buyers' point of view, on account of damaged and broken cases. I think most members of the trade will agree with this contention.

Rubber is packed almost entirely in Japanese wooden cases, either "momi" or "veneer"—European "Venesta" cases dropped out when the war came. I think that most planters will agree that the quality of the material of these cases has decreased as the price has increased. Reliable information from Japan (if such exists) tends to show that the enormous demand for wooden cases for rubber, tea, etc., has caused a shortage of suitable timber, so that inferior wood is now supplied. Be the cause what it may, the cost of packing materials for rubber is now more than four times what it used to be. I remember Japanese momi cases at 35 cents each; they are now $1.40, and the condition in which many consignments of rubber reach London is deplorable. And that in spite of constant reconditioning and coopering at ports, attentions which cause considerable expense to estates and annoyance to all concerned. No doubt a praiseworthy desire to pack the maximum amount of rubber in each case, and thus save expense, adds to the toll of burst and shattered boxes.

Some years ago an attempt was made in the Federated Malay States to pack rubber under a patent process, by means of which it was rolled (like bandage rolling) into cylindrical shape and kept rolled tight by its own elesticity. These bales of rubber were then sewn up in cloth and hessian for shipment, and trial consignments certainly stood the journey well, and there were no complaints as to loss or damage. The idea did not catch on, probably because only crepe could be so baled, sheet being too short in length. Canvas has also been tried for packing, as well as grass mats. Locally made wooden cases have been tried with a certain amount of success, but the wood used is too heavy and splitty to be a good material, and the supply of suitable timber is limited, and the cost, therefore, increasingly expensive.

What I suggest are rubber cases, that is, cases made of rubber, of properly manufactured rubber sheeting, one-quarter inch or three-eights inch thick, to take the place of wooden cases. These rubber boxes might be made the same size of the momi (19 in. by 19 in. by 24 in. closed) on much the same principle as the collapsible cardboard boxes often used in shops for packing sweets and chocolates. Or the tops and bottoms and sides and ends could be made seperately like the wooden pieces and then made up into boxes, not, of course, by nailing, but by fastening like ordinary hinges with lengths of stout wire, the edges of the rubber boards being cut and fashioned like the joining edge of a hinge. Or, perhaps, best of all, round the edges of the rubber board eyelets like those in boots could be punched and metalled so that the requisite boards could be laced tightly together with split rattan or other suitable local fiber.

On the delivery of the rubber the lacing could be cut through and the rubber boards be "shooked" up and sent back to the estate to be used over again. If well made they would surely be good for many journeys, for they ought not to crack or break. The estate name could be stamped or embossed on the boards when made. Freight backwards should not be excessive for it used to be economical to send venestas from London to the East. The initial cost would no doubt be heavy, but each estate would supply the rubber necessary for its own cases, and the initial cost would be the only cost, except a small amount for freight on "empties" (packed flat).

By this means the rubber producers would be killing two birds with one stone, for they would be evolving a sound packing material for their rubber and be using up their own all-too-abundant produce in that proceeding.

It is not easy to work out many figures in connection with this proposal, with the exception of the following:—I calculate that an estate producing 25,000 pounds of rubber a month (no decent estate produces more than this in these days of righteous restriction) will need about 150 cases to pack that amount. A period of six months will probably elapse between the shipment of rubber and the return of the rubber "shooks." Therefore 900 cases will be required. At, say, 2½ lbs. rubber for each board, 15 lbs. will be needed for each case, or 13,500 lbs. rubber for the 900 cases, not a very large amount perhaps, but it will be a great help. There is something refreshing about the idea of the rubber estates themselves using up their own rubber for some useful purpose.

What the cost of making these cases would be it is very hard to say. Rubber manufacturers might be asked to make a few hundred samples for experiment, but it is doubtful, in view of recent experience, whether they would be keen on it.

There are many new ideas for fresh uses of rubber hung up because no means exist to try them out. British rubber manufacturers, as a rule, do not appear to show keenness to adopt new uses or help in any way. Under these circumstances there seems to be a great opening for the Rubber Growers' Association to establish a small experimental factory to deal with new ideas on a practical basis. It would seem that expenditure and activity in that direction were more important at the present juncture than research work on the estates. Possibly experiments in making rubber cases could be carried out in the East by the research officers now there.

With regard to a Rubber Growers' Association experimental factory, the question will, of course, be raised immediately —where is the money to come from? Of course, it will be difficult, but an appeal to all producers might not be in vain. Anyway, now that it has been found impossible to combat low prices by cooperation among producers, all efforts should be concentrated on increased consumption by means of new uses for rubber. And as these cannot be forwarded except by our own initial efforts, no stone should be left unturned to endeavor to establish means to this end.

Rubber Clay Composition

British Patent No. 172,711 describes a process for making rubber compositions which contain clay. The well-known British rubber chemist, P. Schidrowitz, is one of the patentees. The rubber and clay are mixed together with water-soluble soap in the dry state. An example of such a soap is an alkali oleate or the equivalent of it such as dry alkali and oleic acid. An excess of alkali such as anhydrous sodium carbonate may be added as well. About 3 per cent each of sodium carbonate and soap are used in making the mixture. The clay used is preferably a colloidal clay. The sodium carbonate is preferably ground with the clay, the treated clay introduced into the mixer, and the oleic acid gradually added during mastication. The mixture may be vulcanized at 40 pounds pressure in from 45 to 75 minutes. The product obtained in this manner has a high breaking strength and good distensibility.

Health Hazards in Rubber Factories

By C. F. Horan

Hood Rubber Co.

C. F. HORAN, Chairman of the Committee on Health Hazards of the Rubber Section of the National Safety Council, presented the following report for the Committee at the Congress held in Boston last September:

"I have wondered, after hearing Dr. Weber the other day, whether the members of this Section would be interested in receiving an outline of the symptons of the dangerous materials that we use. It will take a little time and some work to get out a book on the diagnosis of rubber industry occupational diseases, but if the members felt that it might be of some assistance to them, I know the committee would be glad to get busy and get out such a report.

"Because of the fact that the work of this committee has had to deal with new and untried fields, plus the responsibility of dealing in many cases with secret processes of the various members, it has been considered advisable to render individual reports to the members, rather than publish general bulletins.

"During the past year studies have been made of the following materials used in the rubber industry and problems: Xylol, toluol, benzol, solvent naphtha, lead, antimony, thiocarbanalide, aniline, dangers from vapor cures, sulphur chloride, hexamethylene tetramine, carbon tetrachloride vs. disulphide, soapstone dusts, and dermatitis from shoe stains.

"The reports concerning these investigations have been filed with the members requesting specific information.

Dangers of Lead Poisoning

"Inquiries have been received from several members concerning the real dangers of lead poisoning to employees who handle leaded stock after it is mixed, and who are not exposed to the dust hazards of the mixing and compounding rooms. The committee has undertaken a series of chemical experiments along the lines outlined and has concluded that it is practically impossible for a cutter, or boot-maker or other employee not exposed to the hazards of mixing, to contract lead poisoning as a result of his occupation. The liability to lead poisoning from mixed stocks would seem to depend greatly on the degree of acid or alkaline reaction of the individual's sweat; persons with either greatly acid or greatly alkaline sweat may receive an occupational poisoning from their work, but the possibilities of finding employees whose sweat is sufficiently abnormal are so remote as to justify the opinion that danger from this source does not normally exist.

"Your committee has co-operated with the Rubber Institute of America in publishing a resume of literature on the matter of benzol poisoning.

Organic Accelerators Improved

"Quite a decided improvement has been noted during the year in the matter of organic accelerators. Your committee has been instrumental in obtaining some direct action by manufacturers of accelerators, especially manufacturers of the aniline group. A number of less hazardous accelerators of this type are now being placed on the market and it is to be expected that these new accelerators will gradually replace the more dangerous compounds now being used. Apparently the best of these newer accelerators is akbar, which has been developed by the Fisk Rubber Company. As I understand it this is somewhat of a secret compound and is not purchasable by other rubber companies.

Research Work for Coming Year

"The department of biology and public health of one of the largest eastern colleges has accepted the subject of "The Bacteriology of Rubber From a Public Health Standpoint," for research work. An experienced bacteriologist will be assigned to this work by the college, and the experiments will be conducted under the supervision of this committee. It is to be hoped that this research will indicate whether or not boils and carbuncles may be caused by raw rubber.

"Members of the section who are confronted with special problems in industrial hygiene are invited to make use of the facilities which this committee has to offer them."

Smoke Fuel - A Future Rubber Estate Problem

In the perennial debate as to whether sheet or crepe manufacture is preferable from the producers' point of view, one important consideration is often lost sight of, and that is how long are our wood fuel supplies going to last?

We have called it "A Problem of the Future," but it is indeed, in many cases, already a problem of the present. In several districts the prices of wood fuel are already beginning to show a serious increase, and estates that have no timber reserve of their own are finding it a difficult matter to obtain supplies.

In the past those estates that possessed no jungle land or reserve areas were able to purchase from their more fortunate neighbors or from the natives (and sometimes, be it remarked, it was not advisable to enquire too closely whence the natives' supplies were drawn); but now there are few estates willing to sell their fuel wood to outside buyers, and the native sources of supply are becoming exhausted or the control of the neighboring reserves has become more strict.

Then there were many estates which for years found an ample fuel supply in the timber from old coffee gardens which they were cutting out, or were actually using Hevea wood during the period when thinning out was a necessary and important branch of plantation work. Nowadays, however, old coffee has either been cut out and finished, or is being carefully nursed as an additional stand-by in the critical state of the rubber industry; while thinning out of rubber, although of course, continuously necessary on any well-managed estate, is not proceeding on the same scale as a year or two ago, when the urgent necessity for more space and air on the old plantations was first recognized.

Some plantations situated in coconut districts have tried using coconut husks as fuel with apparently successful results, but it is obvious that this can only be done in the palm areas and where there are no coir or rope factories to compete with the rubber estates for the raw material.

This mention of coconut fuel brings us to the fringe of another problem, which, however, hardly comes under the scope of this article, and that is the question as to which fuel gives the best smoke for the purpose. Although we will not attempt to deal with this point now, it is certainly one which would have to be considered if it ever becomes necessary to have special plantations for fuel-producing purposes.

Three obvious methods suggest themselves for dealing with a fuel shortage, suppose it to exist.

(1) Stop smoking. This, however, means the adoption of some other method of preparation, such as the manufacture of crepe, block, or some other form of rubber, and this in turn would entail fresh expenditure on the crepe batteries or other apparatus necessary; quite apart from other considerations, such as the market price for rubber in the new form, re-training the staff, etc.

(2) Planting of special fuel timber areas. This, in cases where suitable ground is available, would seem to be far the most desirable solution, as it must not be forgotten that many estates in particularly damp or less warm climates have to

supply fuel to heat their drying houses, or at least sufficient to supply hot air to drying house fans, and this must be carried on even if smoking is abandoned.

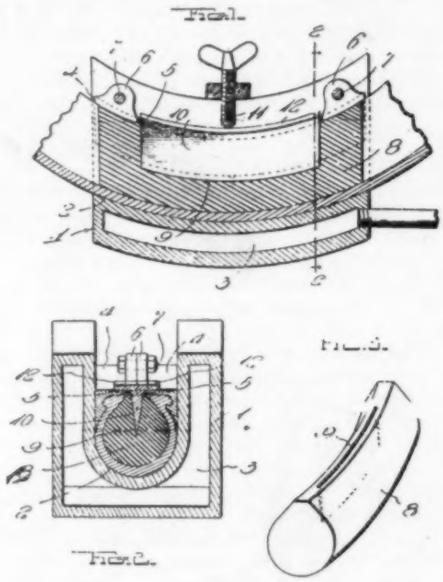
(3) The introduction of a cheap and efficient smoke producer. Whether this latter method is a commercial possibility remains for the chemists to say.

In the present days of stress a minor problem such as that outlined above is liable to be neglected, nevertheless it is a problem that is already giving many estate managers furiously to think, and any intimation that the difficulty is being considered, and suggestions and methods of meeting it are being devised, would be most welcome to those responsible for the administration of the estates. (*Contributed to the India-Rubber Journal*).

The Everett Vulcanizing Core

The Everett expansible tire vulcanizing core is designed to take the place of the usual pneumatic cores or air bags.

In the accompanying illustration Figure 1 is a central vertical longitudinal section through a vulcanizer embodying this invention: Figure 2 is a vertical cross section taken on



the line 2-2 of Figure 1 and Figure 3 is a perspective view of the core in its normal contracted condition.

In the illustration briefly described above, the numeral 1 designates a well known form of vulcanizing mold provided with the usual bead clamp which in the present instance is constructed in two halves, 4 of which are recessed at their meeting edges to provide a longitudinal slot 5 extending between the usual ears 6 at the ends of the clamp, said ears being secured together by bolts 7 in the usual manner.

Receivable in the tire to be vulcanized is the improved core 8 constructed of rubber or other appropriate elastic compressible material, said core being provided with a longitudinal slit which registers with the slot 5. A wedge 10 is insertible in the slit 9 through the slot 5 for the purpose of expanding the core and compressing the portions at opposite sides of the slit to effectually hold the tire casing against the sides of the mold. The usual clamping screw 11 is employed for holding the tire down against the bottom of the mold, but instead of acting against the bead clamp in the usual manner, the screw bears downwardly on the wedge 10 as clearly shown in Figure 1 of the illustration, thus forcing the wedge into the slit 9 to expand the core 8, and when the maximum expansion has taken place the shoulders 12 on the butt edge of the wedge engage the bead clamp, whereby further action of the screw will force the wedge and bead clamp downwardly, thus compressing the core into the tire casing.

It is claimed that the use of a rubber core constructed in accordance with this invention will produce quicker and better cures than air bags or pneumatic cores now commonly used in tire vulcanizing. The core 8 and wedge 10 will, it is said, be more economical in use due to the comparatively long life of the former and to the fact that no time will be wasted by inflation, as with the ordinary air bags. Furthermore, greater pressure may be created to hold the tire casing against the bottom and sides of the mold, than can be obtained by the use of an air bag. It thus follows that overflow of the green rubber is prevented and the density of the patch when completely vulcanized, will be much greater than with the tire vulcanizer now commonly used.

A New Rubber Composition

In French Patent No. 518,846 there is described a process for making certain compounds known as sulpho- terpenes which are very useful for admixture with rubber. These compounds are made by starting with terpentine and adding to it an equal weight of sulphur. The mixture is placed in a proper receptacle, which is provided with a reflex condenser, so that during the process the volatile vapors that are evolved are condensed and flow back into the flask, while the non-condensable gases are permitted to escape. The mixture is heated gradually until the temperature reaches 150 degrees C. At this point the reaction begins to take place.

During the next hour the temperature is raised to 175 degrees C and the mass is agitated thoroughly. Air is used preferably for this purpose. During the next two hours the temperature is raised at the rate of 12.5 degrees C per hour, while the agitation is gradually diminished and then discontinued altogether. The sulphur combines with the turpentine and sets free hydrogen with which it combines likewise to form sulphuretted hydrogen. It is well to moderate the heating at the start so as to avoid the formation of secondary reaction products.

At the end of the process there is obtained a neutral substance, brittle and hard, which is insoluble in water and partly soluble in acetone. This product contains from 30 to 50 percent of sulphur. By interrupting the process at different stages a variety of products is obtained by varying viscosity and hardness. The semi-solid substance can be used for impregnating fibers, while the solid product is used to good advantage in the vulcanization of rubber. The sulphur combined with the terpene hydrocarbons accomplishes the action.

A Rubber Finishing Composition

The application of rubber to cloth, leather, rubber itself and other materials in order to improve their appearance and render them waterproof is accomplished by making a solution of the rubber in a suitable solvent along with certain ingredients and then applying the mixture, much as one would apply a paint to the material. In this way hand-bags, automobile tops, various articles made from leather and artificial leather are given a coating, which is waterproof and possesses a high glossy sheen. A patent (United States Patent No. 1,400,090) has just been granted on an improved composition of this nature.

The composition is made by taking one part of rubber, such as old automobile casings or other good quality of rubber and adding thereto three parts of water glass. The mixture of the two materials is then boiled for a short time until the rubber has been dissolved. The solution is then cooled and five parts of raw linseed oil and one part of a drier, usually Japan drier, are thoroughly mixed together. One part of lampblack is added or other coloring matter as may be desired. The composition can be applied with a brush and is spread thinly over the surface. It does not crack or injure the surface of the material covered.

ABSTRACTS

Technical — General — Commercial

Compounding Rubber with Gel Emulsion Mixture

The object of this process, patented in United States Patent No. 1,399,789 and assigned to the Goodyear Tire and Rubber Co., is to mix various ingredients with the rubber, such as lampblack, etc., so as to obtain a product of a high degree of homogeneity and uniformity. Several patents have been granted recently which had the same purpose in mind and most of them have used glue as the medium with which to secure the desired effect. All of these processes are based on the principle that when the ingredients are emulsified with a colloid such as glue, or in other words with a gel forming substance, the mixture formed with rubber will be more homogeneous than when the ordinary method of incorporating the fillers with the rubber in the mixing rolls is used. Rubber being a colloid will mix better with another colloid. In the above patented process glue is used likewise, but instead of being emulsified with an agent, such as pine oil, which remains in the rubber, a volatile substance is used for this purpose. This may then be removed completely before vulcanization takes place and a product of better quality and more desirable properties is obtained.

While glue has been found to be best suited for this purpose, aqueous solutions of such substances as gums, casein, soap, and other colloids may be used as well. Benzol or toluene may be employed as the emulsifying agent. The glue is made into an emulsion with the latter and water and the solid ingredient is added and the whole mass is thoroughly agitated until the filler is disseminated uniformly throughout the glue solution. The rubber is then admixed with this emulsion on the mixing rolls. The operation does not take long due to the fact that the emulsion mixes very quickly with the raw rubber, Then before vulcanization the mixture is dried in a vacuum drier to remove the water. It is also possible to completely dry the rubber compound by continuing the milling operation for the necessary length of time.

The proportions used in the process are illustrated in the following example. About 50 pounds of air-dried glue are dissolved in 80 pounds of water by the application of heat and then 2 pounds of benzol are added. Then 100 pounds of lampblack are mixed with this emulsion with constant stirring. This is carried on in any suitable closed vessel so as to avoid the very objectional dusting of the lampblack black.

New Method of Vulcanizing Rubber Shoes

In the United States Patent No. 1,400,618, the Kelly-Springfield Tire Co. has patented a new method of vulcanizing rubber shoes, wherein a highly glossed surface is necessary or desirable. The articles composed in part or in whole of rubber and particularly those which are varnished may be cured under pressure by this method in a relatively short time. They will accordingly be much more economical and durable than the same articles made by other methods. In the regular process of manufacture there is always present the danger of blistering the shoes which renders them unfit for sale.

The vulcanization takes place in a kettle of the well known cylindrical type. The kettle has double walls, the interspace being used as a steam jacket whereby the kettle is heated. There is also provided an air heater, which is a separate piece of apparatus, comprising a coil of pipe with a casing fastened around it. The air heater is likewise heated with steam. On the bottom of the vulcanizer there is an arrangement for holding the rubber shoes which have been built upon wooden lasts. There are inlets and outlets provided for steam and for the heated air. The capacity of the air heating coil is such that it holds enough air to fill the vulcanizer under pressure. A small fan is secured to the lid of the vulcanizer and is used to circulate the air within the apparatus. A thermometer is also inserted through the cover.

After the shoes have been arranged in an upright position on the bottom of the cylinder and the lid has been bolted on, the air heated previously in the coil, is admitted under pressure to the chamber at the desired vulcanizing temperature. The function of the steam jacket is to maintain this temperature constant. After all the air has been forced into the chamber, the valve on the steam inlet pipe is opened and steam is admitted to the vulcanizer. The steam-moistened air is kept in constant circulation by the small fan. The articles are kept within the apparatus until they are completely vulcanized. It is claimed that this method allows the vulcanization of highly varnished articles in a steam-filled atmosphere without their being injured in any way and without loss of luster.

Hollow Rubber Articles

A method of making hollow rubber articles such as balls, bulbs, etc., from raw rubber in sheet form is patented in United States Patent No. 1,400,146. The particular advantage claimed for the process is that the trimming of the rubber articles may be accomplished while the rubber is still in the raw state and consequently the rubber waste can be used over again without any treatment. It is also said that the articles made in this manner are perfectly spherical or they may be made in any other desired contour without distortion.

The molds used in the process will form several balls simultaneously. Each half of the mold has a passage cut through it which is connected externally with a suction pump, and which is connected internally by means of ducts with the backs of the several mold sockets. The two sheets of raw rubber are placed between the molds, and then the core piece is inserted and the upper and lower parts of the molds are brought together. Suction is then applied and the rubber is caused to adhere tightly to the sides of the sockets. Then the molds are separated and the core pieces are removed. The molds are then brought together again and the ends of the rubber sheet, which are held in the sockets by the suction, are fastened together with the aid of a little rubber solvent such as benzine. The ends are made to unite under pressure and then the rubber is ready to be vulcanized. Before the molds are put together after the removal of the core pieces, a little ammonium chlorate or other suitable substance is added, according to the regular practice, which forms a gas at the vulcanizing temperature and keeps the finished balls from collapsing. The trimmings fall away as pressure is applied.

Rubber Adhesives

In the manufacture of rubber adhesive solutions, if the rubber is not sufficiently soluble in the solvent, it is advisable according to German Patent No. 331,031 to heat the rubber in the air to a temperature above the melting point under the pressure of about an atmosphere. In this manner the rubber is made more soluble and a better adhesive is obtained with it.

Increasing the Elasticity of Rubber

The Bayer Company has just been granted a patent, see German Patent No. 332,347, on a process of increasing the elasticity of natural and artificial rubber. The process consists in adding to the rubber, before vulcanization, an aryl or an arvlykl ether oxide. For example, this effect can be attained by using 5 per cent of the dibenzylic or the dixylic ether.

Rubber Mastic

A valuable rubber cement is made in accordance with German Patent No. 333,215 from an aqueous solution of gum tragacanth and an ethereal solution of rubber. The mixture of the two solutions is heated to a temperature which is lower than the boiling point of ether.

NEWS OF THE INDUSTRY

Little Change in Rubber Situation

Real Basis for Confidence in the Volume of Business for 1922 Seen—Increases in Production Almost Certain—Fisk Rubber Company Averages Big Output

There was comparatively little change noted in the industrial situation during the last month other than that incident to the general accounting which usually takes place at this season of the year. Rubber men have been occupied in making up balance sheets and inventories and reconsidering their positions in the light of these figures. Under such circumstances it is natural that orders should be light and collectors more pressing in their demands.

On the other hand, the drastic changes which took place last year and which have left the industry in a much sounder position than it held at this time a year ago, are grounds for more than mere hopefulness in the future. The real basis for confidence in the course of business in 1922 is now clear. Notwithstanding the severe depression during 1920 and 1921, purchases were of sufficient volume to absorb accumulated stocks. A gradual increase in production is, therefore, to be expected.

Although unemployment is unquestionably widespread, its extent has probably been over-estimated. Government figures indicate 2,500,000 persons now out of work, compared to 5,000,000 idle last summer. By spring, officials said, everything indicates that probably not more than 1,500,000 persons will remain in the ranks of the idle.

Akron May Call for Workers

With continued increases in activities of rubber factories such as have been witnessed during the past two months the supply of rubber workers living in Akron will soon be exhausted. A large number of men will be needed from the outside if production continues to expand. The announcement that Akron is in need of men, which is not expected to be made until early in the summer, will not bring the number who responded during the past three or four years. Tire manufacturers no longer pay the high wages which attracted men from all parts of the country during the war and post-war period.

Akron Wage Level Low

Wages in Akron have reached a much lower level. When the depression first hit the industry ten and fifteen per cent wage reductions followed one another in rapid succession. These were followed by the shifting of men from high paying jobs to those which paid less. At the same time wholesale discharges became the order of the day. Efficiency increased, and probably at no time in the history of the industry has labor efficiency been so high. The speed attained by some of the men in the factories is such that it is a question whether it can be maintained.

Common labor is plentiful at twenty to thirty cents an hour. Tire builders, who formerly made from fifteen to twenty dollars a day are content if they make seven now. These are the highest paid men in the tire industry with the exception of pitmen. The number of unemployed in Akron, estimated at 11,000 several weeks ago, appears to be somewhat decreased in several classes.

Fisk Rubber Company is Prosperous

The Fisk Rubber Company, Chicopee Falls, Mass., has emerged from the shadow of general depression, if their present daily output is any index. During the month just passed production averaged 9000 casings daily which contrasts with 3000 during the spring of last year. The present rate of production is expected to be maintained during the remainder of this month, with a gradual increase during the months of March, April and May until an output of 15,000 tires a day is reached in June. Current operations are at about sixty per cent of capacity, of which forty per cent are cord tires.

Sales are satisfactory in volume, with the total volume slightly in excess of production. Stocks at the factory are kept at a figure below normal, the Fisk company having now on hand about 45,000 tires. Fisk dealers number 40,000, representing an increase of 10,000 during the past year.

The company's supplies of crude rubber are carried at prices below current market levels, it is stated, while cotton fabric is priced at the market.

An interesting sidelight on the increased efficiency of labor is indicated by the fact that the Fisk company today is employing from 3200 to 3300, contrasted with more than 6000 at one period during the war.

The Federal Rubber Company, Cudahy, Wis., which is a Fisk subsidiary, is turning out 3000 tires daily, of which one-third are cord tires, and when capacity output is attained is capable of producing 4000. About 1200 employes are on the payroll.

Rubber Division of Department of Commerce Issues Monograph

The first of a series of outline monographs has been issued by the Rubber Division of the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., according to a statement made February 6 by P. L. Palmerton, chief of the Division. The monograph deals with "Facts affecting the Importation of Rubber Products into Argentina."

Each succeeding monograph will contain in definite and logical outline form the facts which influence the market for rubber goods in a specific country. The same arrangement will be observed in each monograph in the series, so that export managers will be able to turn at once to the subject in which they are interested.

The information which will be presented in the monographs will represent a condensation of all the data in the files of the Division at the time. Many of the statistics will be gleaned from original sources, and all of them will be as recent as can be obtained. The Division will not undertake to interpret facts and figures, it being expected that each user of the monographs will analyze it for whatever it may reveal of market possibilities or peculiarities.

"Notwithstanding the magnitude of the task," wrote Mr. Palmerton, " we hope to issue a monograph covering each of the principal countries of the world. Each will be conveniently bound in loose-leaf form so that we may send supplementary or correctional sheets at any time. Six months hence we hope to revise the entire series and issue them according to continents."

Copies will be furnished exporting rubber companies on application to the Rubber Division, Department of Commerce, Washington, D. C.

Alling Rubber Company Elects

At the annual meeting of the Alling Rubber Company, Albany, N. Y. on January 30 the following officers were re-elected: N. E. Alling, president; S. N. Blakeslee, vice-president; W. C. Minor, secretary and treasurer; H. A. Sheldon, assistant secretary and treasurer.

New Distributors for Goodrich

Four new distributors of druggist sundry rubber goods have been chosen by the B. F. Goodrich Company, Akron, Ohio. They are: Atlas Rubber & Belting Co., Cincinnati; Bedsole-Colvin Drug Company, Mobile, Ala.; J. B. Riley Drug Company, Macon, Ga. The Atlas company has branch offices in Dayton and Huntington, W. Va., and handles rubber goods exclusively, specializing in sundries, mechanical rubber goods, clothing, tires, footwear, rubber toys and novelties. Although young in years the Bedsole-Colvin Drug Company is one of the largest companies of its kind in the south.

Distribution of Goodrich druggist sundries has been greatly strengthened in Alabama by the addition of the J. B. Riley Drug Company and the addition of Mathews Bros., Inc., completes a strong distribution network in Pennsylvania.

Activities of the Rubber Association

Traffic Committee Meets—Report of Tire and Rim Association for December, 1921—Rates on Balata Reduced

The Traffic Committee held its Annual Meeting in the Yale Club on January 9, 1922, and in addition to electing officers and the Executive Committee to serve for the current year, disposed of a docket containing a large number of subjects.

The officers elected for the current year are:

Chairman, Mr. A. D. Phillips, Fisk Rubber Company.

Vice-Chairman, Mr. L. H. Ley, Kelly-Springfield Tire Company.

The Executive Committee for the current year consists of the following to serve for the terms designated:

For terms of one year: Mr. A. D. Phillips, Fisk Rubber Company; Mr. T. R. Stoughton, Pennsylvania Rubber Company; Mr. R. P. Bowe, Goodyear Tire & Rubber Company.

For terms of two years: Mr. H. J. Zimmerman, The B. F. Goodrich Company; Mr. Geo. F. Hichborn, United States Rubber Company; Mr. L. H. Ley, Kelly-Springfield Tire Company, and Mr. E. C. Knox, Firestone Tire & Rubber Company.

Report of Tire and Rim Association for December, 1921

The Tire and Rim Association, during the month of December, 1921, inspected and placed their stamp of approval on 383,928 rims for pneumatic tires, in the various rim plants of the United States and Canada, the number being divided as follows:

Size.	*Number.*
26x3	3,512
28x3	6,396
30x3	66,015
30x3½ cl.	190,456
30x3½ ss.	23,300
32x3½	5,049
32x4	47,896
33x4	2,528
34x4	1,606
32x4½	20,570
34x4½	11,447
36x4½	727
34x5	4,210
36x6	15
38x7	102
40x8	292
810x90	101
Total	383,928

Rates on Balata Reduced

Heretofore freight rates have been applied on balata on the basis of second-class in Eastern territory and first-class in Southern and Western territories, regardless of whether it was a carload or less carload shipment.

Effective February 10, 1922, carload rates on fourth class in Eastern and Western territories will apply on shipments in bags, bales or boxes, subject to a minimum carload weight of 40,000 pounds, while the second-class and first-class rates, respectively, on less carload shipments remain unchanged.

Lower Rates on Rubber Heels and Soles to Pacific Coast and Intermountain Territory

In response to a request made by the Traffic Committee of the Association, reduced carload rates on rubber heels and soles have been made effective January 16, 1922, from the east to Pacific Coast ports and Rocky Mountain territory. The reductions are substantial, as for instance, from \$3.83½ to \$2.50 on shipments from the Akron District and from \$4.16½ to \$2.66½ from points east of Akron to western territory. Correspondingly lower rates have been made from origin points west of the Akron District to the far west.

The new rates are shown in the freight tariff as applying on shipments when packed "in bags". As shipments of heels and soles are usually packed in boxes, attention is directed to the fact that under the rules of the tariff applying on shipments to Rocky Mountain and Pacific Coast territory, rates specifically named for shipments in bags will likewise apply on shipments in boxes.

This fact is emphasized in order that there may be no misunderstanding as to the applicability of the reduced rates on rubber heels and soles when packed in boxes.

Reduce Rate on Rubber from Pacific Coast

The import rate on crude rubber from Pacific Coast ports to destinations east of Chicago and St. Louis is \$1.33½ per one hundred pounds.

The Traffic Committee of the Association has been in almost constant negotiation with the Western lines in an endeavor to have this rate reduced.

Information has just been received that the Western lines have arranged to reduce the rates to points as far east as Pittsburgh and Buffalo to 75c per one hundred pounds, with minimum carload weight of 50,000 pounds.

The effective date of the new rate has not yet been determined but it will, no doubt, be made effective within the next forty days.

Mill Notes

For the past few weeks workmen have been constructing an addition to the present factory of the Wayne Tire & Rubber Co. plant at Orrville, Ohio. Although the building will be completed before the end of this month, it is will be some time before new machinery can arrive and be installed, according to E. C. Love, manager. This new machinery will double the capacity of the plant.

The Canton, Ohio, plant of the Republic Rubber Corporation is now producing about 1,000 tires a day.

The Hubbell Rubber Co., Newton Falls, Ohio, will soon start operations at its plant. They expect to employ about 200 men.

Diamond Holdfast Plant Near Completion

The new plant of the Diamond Holdfast Rubber Co., Atlanta, Ga. is rapidly nearing completion. According to H. I. Diamond, president, the company expects to begin manufacture about the first of the year.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires, Etc.

November, 1920, to and including November, 1921

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

(Compiled by The Rubber Association of America, Inc.)

	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
MONTH	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
November, 1920	36	5,880,016	649,742	806,023	40	6,131,935	742,815	920,938	11	298,875	21,355	34,217
December, 1920	43	5,508,380	506,111	1,327,153	43	5,786,929	508,446	1,481,285	12	303,473	16,297	40,828
January, 1921	45	5,319,605	703,430	965,417	47	5,586,163	740,824	1,042,617	12	303,753	21,220	29,116
February, 1921	45	5,193,018	819,892	1,073,756	46	5,415,464	916,627	1,129,881	12	304,374	23,365	29,599
March, 1921	46	4,597,103	1,163,314	1,614,651	48	5,044,861	1,346,483	1,643,690	12	283,800	28,710	43,926
April, 1921	49	4,527,445	1,651,418	1,785,951	51	4,916,772	1,762,122	1,983,571	12	269,985	28,859	42,080
May, 1921	59	4,451,668	2,100,917	2,085,882	57	4,751,880	2,210,040	2,342,567	12	264,633	25,156	40,122
June, 1921	63	4,154,456	2,313,265	2,643,850	60	3,835,098	2,359,928	3,232,673	11	240,336	28,295	49,867
July, 1921	63	3,892,037	2,570,524	2,757,581	61	3,122,815	3,020,981	3,603,248	11	220,003	25,123	55,678
August, 1921	66	3,934,853	3,043,187	2,894,442	64	3,649,319	4,430,152	3,804,060	11	216,367	55,694	66,866
September, 1921	63	3,340,798	1,929,268	2,047,929	62	3,827,830	3,274,822	2,645,758	11	161,832	37,441	50,276
October, 1921	64	3,545,030	1,928,271	1,675,169	64	4,732,016	2,843,918	2,016,371	10	163,299	46,274	45,911
November, 1921	64	3,908,342	1,756,555	1,342,519	63	5,203,568	2,126,211	1,540,299	10	173,451	43,537	34,556

Dayton is Prosperous

January reports of the Dayton Rubber Manufacturing Company, Dayton, Ohio, released by J. A. MacMillan, president and general manager, on January 25 shows large gains over the corresponding period of 1921. During last year the company increased its business more than 150 per cent over 1920, and present indications point to a larger increase this year, according to Mr. MacMillan.

Stamford Rubber Supply Co. To Award Prizes for Best Essays

The Stamford Rubber Supply Company, Stamford, Conn., is inviting members of the trade to submit short papers on the general subject, "The Uses of Rubber Factice in Compounding." Any phase of the subject may be treated, such as:

"The Advantages of Factice in the Rubber Compound."

"Reasons why Consumption of Factice Remained Normal During the Low Rubber Market"

"Uses of Factice in Proofing"

"Uses of Factice in Druggists' Sundries"

"Uses of Factice in Tires"

"Uses of Factice in Mechanicals"

"Why I Use Stamford Factice"

"Why I buy Stamford Factice"

"A Comparison Between Uses of Factice Here and Abroad"

Papers should be addressed to "Judges," c/o The Stamford Rubber Supply Company, Stamford, Conn. Do not sign the article with your name but with a distinguishing mark. Enclose with the article a separate sealed envelope containing a slip on which is written your name and address and the mark placed on the article. This envelope will not be opened until the judges have chosen from the prize-winning papers. The best paper will be awarded a prize of $100.; for the second, $75; and for the third and fourth, $50 and $25 respectively. For all other papers retained, $5 will be paid. All papers retained may be used wholly or in part in the company's advertising but no names will be used except by permission of the author.

Officers and Committees of the M.A.M.A.

Announcement was made January 30 by M. L. Hemingway, general manager of the Motor and Accessory Manufacturers Association of elections to the board of directors and committee appointments for 1922. The four directors whose terms expired this year, E. P. Hammond, president, Gemmer Manufacturing Company, Detroit, Mich.; C. E. Thompson, president, Steel Products Company, Cleveland, Ohio; A. W. Copland, president, Detroit Gear and Machine Company, Detroit, Mich.; and G. W. Yeoman, vice president and treasurer, Continental Motors Corporation, Detroit, Mich., were all re-elected to the board of directors.

The new board of directors re-elected the same officers who served during 1921, as follows: president, E. H. Broadwell, vice pres. The Fisk Rubber Company, Chicapee Falls, Mass.; first vice pres., W. O. Rutherford, vice pres. The B. F. Goodrich Rubber Company, Akron, Ohio; second vice pres. A. W. Copland, pres., Detroit Gear and Machine Company, Detroit, Mich.; third vice pres., H. L. Horning, secretary and gen. manager, Waukesha Motor Company, Waukesha, Wisc.; treasurer, L. M. Wainwright, president, Diamond Chain and Manufacturing Co., Indianapolis, Ind.; secretary and asst. treasurer, G. Brewer Griffin, Westinghouse Electric and Mfg. Co., Springfield, Mass.

The other members of the board of directors besides the officers already enumerated are C. H. Flintermann, vice. pres. Detroit Pressed Steel Co., Detroit, Mich.; F. Glover, vice pres. and gen. mgr., Timken-Detroit Axle Company, Detroit, Mich.; J. M. McComb, vice pres., Crucible Steel Company of America, P. O. Box 11, Grand Central Station, N. Y. C.

President E. H. Broadwell today announced the following committee appointments for the year 1922.

Executive Committee: E. H. Broadwell, Chairman, Fisk Rubber Co., Chicopee Falls, Mass.; C. E. Thompson, Steel Products Co., Cleveland, Ohio; W. O. Rutherford, B. F. Goodrich Co., Akron, Ohio; G. Brewer Griffin, Westinghouse Electric & Mfg. Co., Springfield, Mass.; C. H. L. Flintermann, Detroit Pressed Steel Co., Detroit, Mich.

Finance Committee: E. H. Broadwell, Chairman, Fisk, Rubber Co., Chicopee Falls, Mass.; C. E. Thompson, Steel Products Co., Cleveland, Ohio; E. P. Hammond, Gemmer Manufacturing Co., Detroit, Mich.; W. O. Rutherford, B. F. Goodrich Co., Akron, Ohio; G. Brewer Griffin, Westinghouse Electric & Mfg. Co., Springfield, Mass.; A. W. Copland, Detroit Gear & Machine Co., Detroit, Mich.; J. M. McComb, Crucible Steel Co. of America, Pittsburgh, Pa.

Membership Committee: A. W. Copland, Chairman, Detroit Gear & Machine Co., Detroit, Mich.; G. W. Yeoman, Continental Motors Corp., Detroit, Mich.; Fred Glover, Timken Detroit Axle Co., Detroit, Mich.

Banquet Committee: H. L. Horning, Chairman, Waukesha Motor Co., Waukesha, Wis.; E. P. Hammond, Glemmer Manufacturing Co., Detroit, Mich.; W. O. Rutherford, B. F. Goodrich Co., Akron, Ohio.

Committee on Association Relations: G. Brewer Griffin, Chairman, Westinghouse Elec. & Mfg. Co., Springfield, Mass.; A. W. Copland, Detroit Gear & Machine Co., Detroit, Mich.; M. L. Hemingway, Motor & Accessory Manufacturers Association, New York, N. Y.

Show and Allotment Committee: W. O. Rutherford, Chairman, B. F. Goodrich Rubber Co., Akron, Ohio; G. Brewer Griffin, Westinghouse Electric & Mfg. Co., Springfield, Mass.; C. H. L. Flintermann, Detroit Pressed Steel Co., Detroit, Mich.

Thomas Crowley Dead

Thomas Francis Crowley, for nearly half a century prominently identified with the Lambertville Rubber Company, Trenton, N. J., and for many years superintendent of the boot and shoe department, died at his home in Newark January 29 after an illness of two years. The funeral was held February 1. Mr. Crowley is survived by his wife, with whom he celebrated their golden wedding anniversary on January 12, 1921, and five children.

Du Pont Chemical Fellowships

E. I. du Pont de Nemours & Company, Wilmington, Del., has authorized the continuance of Du Pont chemical fellowships in twenty colleges and universities throughout the United States for the scholastic year of 1922-1923. The total value of these is $15,000. The fellowships are for postgraduate work and are placed in the institutions which have well established postgraduate courses.

The recipients are to be selected not by the Company, but by the university authorities, the only condition made by the Company being that the awards shall go to graduates who devote the major part of their time to the study of chemistry.

The object of the plan is to promote the study of chemistry and to assist deserving students, who have shown especial aptitude for chemistry, to pursue further work. This differs from the usual plan for industrial fellowships in that the Company does not insist on the student carrying out an investigation on subjects in which the Company is interested, but leaves him free, under the direction of his instructors, to follow whatever line of investigation seems to him most promising.

The institutions which receive these fellowships are: Brown University, Providence, R. I.; California Institute of Technology, Pasadena, Calif.; University of California, Berkeley, Calif.; University of Chicago, Chicago, Ill.; Columbia University, New York, N. Y.; Delaware University, Newark, Del.; Havard University, Cambridge, Mass.; University of Illinois, Urbana, Ill.; Johns Hopkins University, Baltimore, Md.; Lafayette College, Easton, Pa.; Massachusetts Institute of Technology, Boston, Mass.; University of Michigan, Ann Arbor, Mich.; University of Minnesota, Minneapolis, Minn.; Ohio State University, Columbus, Ohio; Princeton University, Princeton, N. J.; University of Virginia, University, Va.; University of Washington, Seattle, Wash.; University of Wisconsin, Madison, Wis.; Yale University, New Haven, Conn.; Cornell University, Ithaca, N. Y.

For the past four years chemical fellowships have been established in American institutions of learning by the Du Pont Company. The policy was adopted at the time of the war, when the need for developing in this country a self-contained native chemical industry was demonstrated.

Denman-Myers Co. Elects

Stockholders of the Denman-Myers Cord Tire Company, Warren, Ohio, met in that city on January 16. The entire board of directors was re-elected and the name of F. F. Dugan was added to the list which includes the following: Walter R. Denman, Walter E. Myers, John E. Morris, W. B. Prenter, F. C. Raymond, F. W. Stillwagon, E. H. Peck, L. M. Harper, P. A. McCaskey, H. K. Ferguson and F. F. Dugan. The officers are: Walter E. Myers, president; E. H. Peck, vice-president; Walter R. Denman, general manager and secretary; John E. Morris, treasurer, and L. M. Harper, assistant secretary and assistant treasurer.

American Rubber & Tire Co. Holds Annual Meeting

At the annual meeting of the stockholders of The American Rubber & Tire Company, held at the offices of the company, Wednesday, February 8th, Henry L. Houk, general manager, in his report showed the company to be in a prosperous condition.

The sales in dollars and cents are equal to that of the previous year. The same scheduled rate of production was maintained throughout the entire year. The losses during the early part of the year were more than offset by the profit during the latter half. Dividends have been paid regularly on the preferred stock.

The statement shows total net assets of $1,781,859.14 and total owing, in notes and accounts payable, $523,393.07.

Mr. Houk in conclusion stated that although he viewed the outlook with greater optimism than at any time since the year 1919, the company would continue to follow its usual conservative policy.

United Rubber Corp. Formed

E. J. Warren and others of the Warren Tires Stores Co., Portland and Bangor, Maine have recently incorporated the United Rubber Corporation for the purpose of manufacturing and marketing rubber goods, especially those allied to the automotive industry. The Warren Tire Stores Co. recently added the following members: Leo S. Warren of Waterville, William M. Kent and Laurence L. Murray of Portland.

Thropps to Run Hendrie Rubber Co. Plant

The John E. Thropp's Sons Company, has been forced to take over the plant of the Hendrie Rubber Company, Torrence, California, to satisfy bonds issued them for machinery furnished. Intending to operate the plant with a view to selling it as a prosperous organization, the Thropps company filed articles of incorporation on January 27, and will begin manufacturing as soon as possible.

Authorized capital stock in the new organization, which is purely a Thropp interest, and is to be known as the Hendrie Rubber Tire Company, is 10,000 shares of common stock without par value. The paid in capital is said to be $200,000. From the beginning of operation, the plant will have a daily capacity of 350 tires and 200 tubes. Mr. Baker, the treasurer, who has been identified with Thropp interests for years, will take up his residence in California to supervise the plant. He will be accompanied by Oliver Knowles and Thomas Curtis, who have also been associated with Thropp's for some time.

Bergougnan's Profitable Year

The annual report of the Establishments Bergougnan, the well-known French rubber manufacturing concern, of Clermont-Ferrand, France, shows a net profit of 11,519,319 francs for last year's operations. The directors recommend a dividend of 65 francs per share on the old shares (against 60 francs last year) and a "super-dividend" of 40 francs on the new shares. In the balance-sheet stocks of raw materials and goods in course of manufacture stand at 18,191,381 francs, while the stocks of manufactured goods are represented by an entry of 21,981,991 francs.

This company also operates the Bergougnan Rubber Corp. at Trenton, N. J.

Servus to Build Plant

According to an announcement dated January 28, the Servus Rubber Company, rubber footwear, will occupy a building to be erected at Rock Island, Ill. as soon as the site can be obtained. The company will be capitalized at $500,000 and is headed by Judson J. Adams, formerly western sales manager of the Beacon Falls Rubber Shoe Company, Beacon Falls, Conn. The first unit of the new plant will be 60x300 feet, three stories high. A second unit, 150x300 feet, will be erected as soon as production begins.

Paint for Tires

Some motorists now habitually paint the tires on their cars white. Investigation shows that practically in all cases this is done to make the tires look new, although there are isolated instances which indicate that protection has been a factor. Undoubtedly, the period of greatest need for protection is during the summer. In winter the durability of paint on tires is negligible at most; due to ice, snow and other causes. A paint suitable to achieve the purpose for most motorists, namely, that of keeping tires white, is a combination of albalith and zinc oxide, in proportions of about 75 per cent and 25 per cent, respectively. This pigment mixture gives the most satisfactory results. White lead when exposed to the influence of heat and sulphur, which is an essential in tire compounding, tends to form a black compound. This tendency to darken, however, is overcome by the albalith-zinc mixture.

May Erect Tire Plant at Miami

Negotiations for the erection of a $25,000 rubber plant at Miami, Fla. are now under way according to L. C. Cadenhead, president of the Memphis Industrial Exchange and also of the Dixie Rubber Company, Memphis, Tenn. of which the proposed factory will be a branch. Upon his recent arrival in Miami shortly after Christmas Mr. Cadenhead went thoroughly into the project with Walter R. Comfort who is associated with him in the tire business.

No definite location for the plant has been selected as yet. The output of the proposed factory will be about 500 tires and 500 tubes per day.

JANUARY IMPORTATIONS OF CRUDE RUB-
(Figures compiled and distributed by The Rubber Association of America, Inc., 52 Vanderbilt Ave., New York Cty.)
[Estimated net weights—long tons.]

PLANTATIONS

From	Tons
Batavia	690
Belawan-Deli	976
Colombo	2,382
Liverpool	168
London	2,212
Malacca	119
Medan	286
Penang	853
Pt. Swettenham	224
Rotterdam	1,272
Singapore	11,204
Sourabaya	388
	20,774

AFRICANS

From	Tons
Antwerp	60
Bordeaux	61
London	40
	161

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	16
Guayule (Mexico)	—
	16

PARAS

Mancas	463
Para	449
Buenos Aires	4
	916

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

	Tons
Waste	85
Balata	42
Miscellaneous Gums	126

COMPARISON 1921-1922

	Jan.-1921	Jan.-1922
Plantations	17,799	20,774
Paras	2,620	916
Africans	821	161
Central	111	16
Guayule	—	—
Manicoba and Matto Grosso	—	—
	21,351	21,867

ARRIVALS PLANTATIONS FOR JANUARY, 1922, SHOWING PORTS OF ORIGIN AND ARRIVAL

From	Arrived At	Tons
Batavie	New York	690
Belawan-Deli	New York	976
Colombo	New York	2,258
Colombo	Boston	124
Liverpool	New York	168
London	New York	2,212
Malacca	New York	119
Medan	New York	286
Penang	New York	853
Port Swettenham	New York	224
Rotterdam	New York	1,272
Singapore	New York	11,091
Singapore	Seattle	45
Singapore	Boston	68
Sourabaya	New York	388
		20,774

ARRIVALS OF PLANTATIONS BY PORTS

Atlantic Ports		
New York	20,537	
Boston	192	
Total		20,729
Pacific Ports		
Seattle		45
		20,774

MARKETS

Cottons and Fabrics

NEW YORK, FEBRUARY 11, 1922

The cotton market has maintained a firmer tone which has had a good effect in steadying the fabric market. Conditions in the New England mill centers where new wage and working conditions are being put into effect will determine the immediate future of the market. It is not thought that the troubles that may ensue will be of any very serious character. The cotton mills of the country had almost come back to normal; the latest figures of the United States Bureau of the Census showing that during December they ran at 93 per cent of normal. A year ago the mills were at the lowest point in the recent depression; operating only a little more than 50 per cent of capacity. Despite the unsettled wage situation the cotton market has shown unusual strength reflecting the strength in the grain and stock markets and the new high records for Sterling.

The total number of spindles in the country is about 36,725,000. The average number of spindles operating the normal working hours during December was 34,154,410 and the mills consumed 511,800 bales of cotton.

The total supply of cotton in all hands in the United States on the first of January was 9,590,804 bales, compared with 12,547,607 bales last year and an average of 10,760,000 bales during the past four years. Spinners stocks were 1,737,771 bales on January 1 compared with 1,251,122 bales last year and a four year average of 1,600,000 bales. Stocks held at compresses, in storage on plantations and in transit amounted to 7,852,000 bales this year compared with 11,296,000 bales last year—an average of about 9,160,000 bales during the past four years. Exports of cotton during the four weeks ending January 20 averaged about the same as last year but were much less than two years ago or in the pre-war times. They totalled only 439,000 bales compared with 450,000 last year and 870,000 two years ago. The same weeks of 1913 and 1912 totaled approximately 1,000,000 bales. The total exports from August 1 to January 20 were 3,197,000 bales; a little larger than last year but less than two years ago. It represents only about half of the exports in corresponding periods in 1912-1913 and 1911-1912.

EGYPTIAN COTTON

Reports from Alexandria indicate that cotton continues to arrive in fairly large quantities, but as the arrivals at the Ginning centers in the interior have fallen off considerably, this is not apt to continue for any considerable period. With a continued fair demand it is generally thought that the present supply will prove insufficient to meet all needs and that much higher prices must prevail. Exports have been active.

Egyptians were in fairly good demand in the local market. Uppers suitable for tire yarn work were available at 25 to 26½ cents and Saks of medium grade were offered at 33 to 35 cents tariff paid; while a higher grade could be had at 39 cents. Highest grades came as high as 44 cents.

To Oppose High Tariff on Egyptian Cotton

The proposed duty of 20 cents a pound on Egyptian extra staple in the interest of the growers of the so called American-Egyptian cotton has aroused the tire manufacturers. A late bulletin of the Rubber Association of America says:

> As a result of an informal meeting of representatives of several of the leading consumers of tire fabrics, held in New York last week, it is expected that the Legislative Committee of the Association will be authorized by the Board to present strong opposition to the proposal before the Senate Finance Committee to apply a high tariff on Egyptian long staple cotton, presumably to protect the growers in the southwest United States. It is the belief of many tire manufacturers, who are the principal consumers of Egyptian long staple cotton, that it is unwise to apply a high tariff on that cotton because it will not have the effect desired by its sponsors of equalizing the price levels of the Egyptian and so-called American-Egyptian, and that it is unsound from the standpoint of international trade policy to impose a high tariff when so little or no benefit can result to the domestic industry; and further, that the proposed high duty will burden the tire manufacturers and the consumer with increased costs, without accomplishing the purpose of the Arizona cotton growers.

PIMA COTTON

Reports from Arizona indicate that the movement of Pima cotton during the month of January amounted to 7,808 bales and that 40,000 bales had been shipped out of the valley since the last of June. There remains in the gin yards 43,994 bales while 33,101 bales have been ginned in the valley this year.

Tire manufacturers are taking more interest in Pima now that a heavy duty on Egyptian cotton seems probable.

TIRE FABRICS

The prices we quote on tire fabrics are nominal and represent figures heard in important centers. There has developed during the fortnight no condition of the tire trade to warrant any change in the fabric market. Reports received from the principal tire manufacturing centers vary in character. Some tire companies are said to have decreased production somewhat during the last few weeks and others are reported to have increased their daily output. The Goodyear Tire & Rubber Company announced an increase of 1000 tires a day bringing the daily production to about 20,000 tires. The fabric market, however, still continues to be strictly a buyer's market.

SQUARE WOVEN			
17¼-ounce Egyptian uppers, combed,	lb.	.70 @	.75
17¼-ounce Egyptian uppers, carded,	lb.	.70 @	—
17¼-ounce Sakellarides, combed,	lb.	.85 @	—
17¼-ounce Sakellarides, carded,	lb.	.75 @	.78
17¼-ounce Peeler, combed,	lb.	.70 @	—
17¼-ounce Peeler, carded,	lb.	.50 @	—
CORD FABRICS			
Combed Sakellarides	lb.	.85 @	.90
Carded Sakellarides	lb.	.80 @	.83
Combed Peeler	lb.	.70 @	.75
Carded Peeler	lb.	.55 @	—
Combed Egyptian uppers	lb.	.75 @	—
Carded Egyptian uppers	lb.	.75 @	—

SHEETINGS—DUCKS—BURLAPS

Sheetings—The very moderate trading that took place was entirely on the low side of prices. Bids were made for sheetings at prices the agents of mills would not consider; in some instances ½ cent under the market. For 40-inch, 3.75 yard, .08¾ cents was asked and 40-inch, 2.85-yard brought .11 cents.

Ducks—The market continues quiet with prices firm. Single filling was up at 14 to 16½ cents, varying according to grade and double filling was offered at 16½ to 17½ cents. Enameling duck was in demand and prices ruled at 34 to 38 cents according to width.

Burlaps—There was a continuous movement of various weights and at prices nominally at 4 cents for lights and 5 cents for heavies. Some evidence was noted of liquidation by users who had taken on too heavy supplies and had not booked the business they anticipated. More activity was reported in near by goods where it is possible to shade a few points but the inquiry for later shipments continued light with sellers holding firm at 4.10 cents on 8-ounce, 40-inch and 5.15 cents for 10½-ounce, 40-inch.

SHEETINGS					
40-inch	2.50-yard	yd.	.12½	@	—
40-inch	2.85-yard	yd.	.11	@	—
40-inch	3.15-yard	yd.	.12¼	@	—
40-inch	3.60-yard	yd.	.10¼	@	—
40-inch	3.75-yard	yd.	.08½	@	.08¾
40-inch	4.25-yard	yd.	.08	@	—
DUCKS					
Belting		lb.	.36	@	—
Hose		lb.	.34	@	—
Enameling		lb.	.30	@	.34
Shoe Ducks		lb.	.40	@	—
Single filling		lb.	.14	@	.16½
Double filling		yd.	.16½	@	.17½
BURLAPS (Carload Lots)					
7-ounce	40-inch	yd.	3.90	@	—
7½-ounce	40-inch		3.95	@	—
7½-ounce	45-inch		4.65	@	—
10-ounce	40-inch		4.05	@	—
10-ounce	36-inch		4.85	@	—
8-ounce	45-inch		4.75	@	—
10-ounce	45-inch		6.00	@	—
10½-ounce	40-inch		4.10	@	—
DRILLS					
37-inch	3.25-yard	yd.	.10	@	—
37-inch	2.75-yard	yd.	.11¼	@	—
37-inch	3.00-yard	yd.	.10½	@	—
37-inch	3.50-yard	yd.	.09¼	@	—
37-inch	3.95-yard	yd.	.08¾	@	—
OSNABURGS					
30-inch	7-ounce		.08½	@	—
40-inch	7-ounce		.10	@	.11

Chemicals and Compounding Materials

THE GENERAL MARKET—NEW YORK, FEBRUARY 11, 1922—The leading manufacturers of industrial chemicals were satisfied with the action of the market during the past two weeks. Many of them are booked well ahead with commitments made by large buyers several weeks ago and look upon the present dull days as a waiting period for the big demand for chemicals which a rapidly recuperating industrial condition is bound to develop. Prices in general are firm and there has been no special tendency to stimulate a dull market by shading prices. The rise in Sterling to new record figures since 1919 has restricted importations and secured for domestic manufacturers of many items a larger share of going business.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .90	@ .95
Aniline oil, bulk basis,	lb.	.16½	@ .18
Excellerex,	lb.	.55	@ —
Formaldehyde-aniline	lb.	.45	@ .50
Hexamethylene-tetramine (powdered)	lb.	.72½	@ .75½
Paraphenylene-diamine	lb.	1.60	@ 1.75
Thiocarbanilid	lb.	.40	@ —
Vulcocene	lb.	.35	@ —

Inorganic

Lead, dry red bbls.	lb.	.08	@ .08¼
Lead, sublimed white	lb.	.06½	@ —
white, basic carbonate	lb.	.06½	@ .07¼
Litharge, commercial, bbls.	lb.	.07½	@ .07¾
Lime, hydrated	lb.	.02	@ .02½
Magnesia, calcined, extra light	lb.	.45	@ —
heavy	lb.	.05½	@ —
Magnesite, powdered	ton	50.00	@65.00

COLORS

Blacks

Carbon Black	lb.	.10½	@ .20
Micronex	lb.	.12	@ .17
Lamp black	lb.	.17	@ .45
Bone "	lb.	.05½	@ .07½
Drop "	lb.	.07½	@ .16
Ivory "	lb.	.15	@ .45

Blues

Prussian	lb.	.50	@ .55
Ultramarine	lb.	.10	@ .35
Cobalt	lb.	.23	@ .30

Browns

Iron oxide	lb.	.05	@ .16
Sienna, Italian, raw and powdered	lb.	.05½	@ .14
Umber, Turkey, raw and powdered	lb.	.04¼	@ —

Greens

Chrome, light, c. p.	lb.	.30	@ .32
medium	lb.	.35	@ .36
dark	lb.	.36	@ .45
commercial	lb.	.12	@ —

Reds

Antimony, crimson	lb.	.35	@ .36
golden	lb.	.21	@ .27
red	lb.	.20	@ .22
Indian, English, pure	lb.	.12	@ .15
Oxide, copperas, pure	lb.	.10	@ .14
reduced	lb.	.11½	@ .12½
Para toner	100 lb.	1.40	@ —
Toluidine tone	lb.	2.50	@ 2.75
Tuscan	lb.	.17½	@ .44
Venetian	lb.	.03½	@ .06½
Vermillion, English, quicksilver	lb.	.85	@ .90
domestic	lb.	.25	@ .30

Whites

Albalith	lb.	.06	@ .06½
Aluminum bronze	lb.	.55	@ .60
Lithopone, domestic (factory)	lb.	.06	@ .06½
Zinc oxide, American Horse Head Special	lb.	.08	@ .08½
XX red	lb.	.07½	@ .08
Zinc oxide, French process, White seal	lb.	.11	@ .11¼
Green seal	lb.	.09¾	@ .10¼
Red seal	lb.	.08¾	@ .09¼

Yellows

Cadmium sulphide	lb.	1.25	@ 1.50
Chrome, light, c. p.	lb.	.17	@ —
dark	lb.	.17	@ —
medium	lb.	.17	@ —
Ocher, French	lb.	.02½	@ .03½
domestic	lb.	.03	@ .05
Zinc chromate	lb.	.33½	@ —

COMPOUNDING INGREDIENTS

Aluminium flake	ton	25.00	@29.50
hydrate	ton	20.00	@22.60
Ammonium carbonate, lump	lb.	.10¼	@ .11¼
Barium dust	ton	100.00	@ —
Barytes, southern off-color,	ton	15.00	@17.00
Western, prime white,	ton	23.00	@ —
Basofor	lb.	.04½	@ —
Beta-naphtol,	lb.	.29	@ —
Blanc fix , dry, f.o.b. works	lb.	.04	@ .04½
Chalk, precipitated, extra light	lb.	.03	@ .03¾
heavy	lb.	.02½	@ .03¼
Clay, China, domestic,	ton	7.50	@ 9.00
imported	ton	16.00	@21.00
Dixie	ton	22.00	@32.00
Blue Ridge	ton	20.00	@32.00
Fuller's Earth, powdered	ton	22.00	@25.00
Fossil flour	ton	60.00	@ ..
Glues, extra white	lb.	.30	@ .40
medium white	lb.	.22	@ .26
cabinet	lb.	.18	@ .30
cabinet low grade	lb.	.15	@ .18
common bone	lb.	.08½	@ .14
Graphite flake, bbls.	lb.	.14	@ .20
powdered	lb.	.04	@ .10
Infusorial earth, powdered	ton	60.00	@ —
bolted	ton	65.00	@ —
Mica, powdered	lb.	.15	@ —
Rotten Stone (powdered)	lb.	.02½	@ .04½
Silica (aluminum)	ton	12.00	@35.00
Soapstone, powdered	ton	.15	@ .20
Starch, powdered corn	cwt.	1.90	@ 2.00
Talc, domestic	ton	18.00	@20.00
French	ton	22.50	@30.00
French, high grade	ton	40.00	@45.00
Italian	ton	.44	@ .55
Terra Alba, American No. 1	cwt.	1.85	@ 2.00
American No. 2	cwt.	1.25	@ ..
Tripoli	lb.	.02½	@ —
Whiting, commercial	cwt.	1.15	@ —
Quaker	ton	13.00	@15.00
English cliffstne	cwt.	1.75	@ 2.00
glider's bolted	cwt.	1.20	@ 1.35
Paris whiteAmerican	cwt.	1.25	@ 1.35
Zinc Oxide— 5 per cent leaded		.07¼	@ .07¾
10 per cent lead sulphate	lb.	.07	@ .07½
20 per cent lead sulphate	lb.	.07	@ .07½
35 per cent lead sulphate	lb.	.07	@ .07½

(Also see whites)

MINERAL RUBBER

Gilsonite	ton	70.00	@ —
Genasco (factory)	ton	50.00	@ —
Hard hydrocarbon	ton	35.00	@38.00
Soft hydrocarbon	ton	33.00	@35.00
Pioneer M.R.	ton	36.00	@54.00
320 M. P. hydrocarbon (c. l. factory)	ton	47.50	@50.00
300/310 M. P. hydrocarbon (c. l. factory)	ton	42.50	@45.00
Synpro, granulated, M.R. (factory)	ton	54.50	@64.50

SOFTENERS

Acids

Acetic, 28 per cent	cwt.	2.50	@ 3.00
Carbolic (phenol)	lb.	.11½	@ .16
Cresylic, 97 to 99 p.c.	gal.	.65	@ .70
Muriatic, 20 dgrees	cwt.	1.40	@ 1.75
Nitric, 36 dgrees	cwt.	5.00	@ 6.00
Sulphuric, 66 degrees	ton	16.00	@17.00
60 degrees, bulk	ton	10.50	@11.00
Tartaric, crystals	lb.	.30	@ —

Alkalies

Caustic soda, 76 p.c.	cwt.	3.50	@ 3.60
Soda ash, 58 p.c.	cwt.	1.65	@ 1.80

Oils

Castor, No. 3, bbls.	lb.	.10½	@ —
Corn, crude, bbls.	lb.	.08½	@ .08¾
refined	lb.	.10¼	@ .11
Chinawood, bbls.	lb.	.14½	@ .15
Cottonseed,	lb.	.10	@ —
Glycerine, c.p. drums	lb.	.16½	@ .17
Linseed, domestic	lb.	—	@ .76
imported		.68½	@ .69
Palm, Niger	lb.	.06¼	@ .06½
Lagos	lb.	.07⅛	@ .08
Peanut, domestic, crude	lb.	.09¼	@ .09½
Pine, steam distilled over 930° sp. gr.	gal.	1.10	@ —
Rapeseed, refined	gal.	.82	@ .84
blown	gal.	.93	@ .95
Rosin, first rectified	gal.	.37	@ —
second rectified	gal.	.39	@ —
Tar, commercial	gal.	.31½	@ —
Soya Bean, crude, bbls.	lb.	.08¾	@ .09

Resins and Pitches

Cumar resin, hard	lb.	.09	@ .12
Cumar resin, soft	lb.	.09	@ .12
Tar, retort	bbl.	9.00	@ —
kiln burned	bbl.	10.00	@ —
Pitch, Burgundy	lb.	.05	@ .06
coal tar	ton	01½	@ —
pine tar		03½	@ —
Rosin, grade K	bbl.	5.85	@ —
Strained	bbl.	6.00	@ —
Shellac, fine orange	lb.	.80	@ —

Solvents

Acetone, drums, c.p.	lb.	.12½	@ .13
Alcohol, denatured, No. 1	gal.	.39	@ .40
Methyl, 95 per cent, drums	gal.	.55	@ .60
Ethyl, 190 proof, bbls.	gal.	4.70	@ 4.80
Benzol, 90 per cent	gal.	.27	@ .33
pure	gal.	.29	@ .35
Carbon bisulphide,	lb.	.06	@ .07
tetrachloride	lb.	.10½	@ .12
Dimethylaniline	lb.	.38	@ .45
Motor gasoline, steel bbls.	gal.	.26	@ —
Toluol, pure	gal.	.30	@ .36
Turpentine, spirits	gal.	.92	@ —
wood	gal.	.78	@ —
Xylol, pure	gal.	.45	@ .51
commercial	gal.	.31	@ .38

Waxes

Beeswax white, pure	lb.	.35	@ .39
Caranuba, No. 1	lb.	.45	@ .46
Ceresin, white	lb.	.09	@ .10
Bayberry	lb.	.20	@ .22
Montan, crude	lb.	.05	@ .05½
Ozokerite, hard, pure,	lb.	.24	@ .25
Parafine	lb.	.02	@ .02¼
Petrolatum, amber, bbls.	lb.	—	@ .04½
dark amber,	lb.	.04	@ —

SUBSTITUTES

Black	lb.	.07	@ .14
White	lb.	.08	@ .16
Brown	lb.	.07	@ .14
Brown factice	lb.	.08¼	@ .15½
White factice	lb.	.09	@ .16½

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	.30	@ .42
Orange mineral, domestic	lb.	.11	@ .13
Sulphur chloride (jugs)	lb.	.20	@ —
Sulphur flour	cwt.	1.45	@ 2.10
Bergenport (c.l.)	cwt.	2.55	@ —
light, 100 p.c. pure	cwt.	2.60	@ 3.15
superfine, 99½ p.c.	cwt.	2.00	@ 2.90

Lithopone—Stocks in the hands of consumers are very small which keeps prices firm. Business in this material has been exceedingly good and the general belief is that there will be a demand in the spring for every pound that can be produced in this country. Prices continue at 6 cents per pound in bags and 6¼ cents in barrels carlots.

Litharge—There was a slight improvement in the demand for this commodity but the market is inactive. Heavier consumption is expected in 1922 than in 1920. Quotations follow: Casks, 7½ at 7¾ cents per pound; 100 pound kegs less than 500 pounds; 12¼ cents; 500 to 2000 pounds, 11.02 cents.

Orange Mineral—Very little interest is shown in either the domestic or imported. Prices remained unchanged Domestic 11 at 13 cents per pound; German, 14 cents; French, 15 cents.

Barytes—The reduction in the price helped the demand considerably and Western producers are very busy. Foreign material continues to come in but has not affected the price of the domestic article; in fact there is a shortage of good domestic product. Prices quoted were $23.00 f.o.b. works for prime Western Foreign brought $32.00 at $35.00 per ton.

Blanc Fixe—The demand continues light and stocks on hand are small. Some foreign material came in but not enough to affect the market. Prices remained at 4 at 4½ cents for dry and pulp at $40.00 at $50.00 per ton.

Carbon Tetrachloride—Prices eased off somewhat and material could be had at 9½ at 11½ cents according to quantity. Supplies on hand are considerable.

Zinc Oxide—Tire manufacturers are showing more interest in the market and the demand from this quarter promises to be large throughout the year. The advance in foreign exchange has increased the price on offerings from abroad. Domestic producers have not changed their prices.

Caustic Soda—All in all the market for caustic soda was weak and althogether unsatisfactory. Price depended much upon quantity and dealer. As low as $3.45 on spot was heard. Most dealers however quoted from $3.50 to $3.60.

Soda Ash—There was some inquiry for carlots but little actual business was done. Small lots of domestic were sold at $1.80. In bag, quotations were from $1.65 to $1.70 ex store.

Phenol—There was a good market for this product; the demand being along broad lines. Leading concerns were quoting 11½ at 12 cents per pound. Off color material was offered at 11 cents.

Toluol—Supplies were none too plentiful and the demand was fairly good. Quotations were 30 at 36 cents per gallon.

Aniline Oil—Trading was fairly active in a declining market. Sales were reported as low as 16½ cents in tank cars at works. Spot quotations were from 17 cents to 18 cents.

Palm Oil—The market was a quiet affair with an easy tone but no particular change in prices. Supplies, however, seemed to be small and any vigorous demand would doubtless send prices higher. Quotations heard were: Lagos, spot 7⅞ at 8 cents; Palm, 8½ at 8¾ cents.

Antimony Sulphuret—There seems to be plenty of this material in the market and the demand is very slight. Prices remain the same, the red material at 18 to 20 cents; the golden at 17 to 18 cents and the crimson at 40 to 45 cents.

Benzene—Producers prices continue nominal in the absence of actual offerings. All varieties are more or less scarce. Occasional lots of the 90 per cent produced were offered at from 38 to 39 cents, drums extra.

Crude Rubber

NEW YORK, FEBRUARY 11, 1922

The course of crude rubber prices during the past week has been slightly downward, the average falling off on most grades having been about ½ cent per pound. Buying interest from the factories appears to be still at a low ebb, so that most of the market activity, as for some weeks past, appears to be between the dealers.

It is reported that the liquidation that had been going on in the London market during January is at an end, and that the inportance of this movement may have been somewhat over estimated in this market.

The fact that First Latex is being so generally neglected by manufacturers who formerly either used it in sizable weights or else have supplies of it still unexhausted has resulted in a depression of the price for this grade to a point below Ribbed Smoked Sheets. During the last half of the week it was generally quoted at ¼ cent per pound under ribs in all positions. It is not so many months ago that First Latex commanded a price in general 2 cents about ribs.

London cables of this date report sellers at 8⅝ d ex store for ribs, and buyers 8½ d. Singapore cables of yesterday quote prompt shipment at 9½ d cif New York for ribs and Latex with off-Latex quoted at 9 d. Exchange today closed sight 4.34, cables, 4.34½.

Quotations on the various grades on this date are as follows:

Plantations			
Ribbed Smoked Sheets spot	.15½	@	.15¾
March	.15¾	@	.16
April	.16	@	.16¼
April/June	.16½	@	.16¾
July/Sept.	.17½	@	.17¾
July/December	.18½	@	.18¾
October/December	.19	@	.19¼
Smoked sheets plain, spot	.13½	@	.13¾
First Latex Pale Crepe, spot	.15½	@	.15½
March	.15½	@	.15¾
April	.15¾	@	.16
April/June	.16¼	@	.16½
July/Sept.	.17¼	@	.17½
July/Dec.	.18¼	@	.18½
October/December	.19	@	.19½
Amber Crepe No. 1	.15½	@	.15¾
" " " 2	.15	@	.15¼
" " " 3	.14½	@	.14¾
Grand Central Crepe	.15	@	.15¼
Light clean Thin Brown Crepe	.15	@	.15¼
Clean Thin Brown	.14¾	@	.15
Commercially Clean thin Brown Crepe	—	@	—
	.14	@	.14¼
Rolled Brown Crepe	.12¾	@	.13
Feb./Mar.	.13	@	.13¼
Paras			
Madeira Fine	.18½	@	.18¾
Acre Fine	.17¾	@	.18
Up-river Fine	.17¾	@	.18
Up-river Medium	.16¾	@	.17
Up-river Caucho ball	.12	@	.12¼
Up-river Coarse	.08	@	nom.
Islands Fine	.16¼	@	.16½
Islands, Medium	.15½	@	nom.
Islands Coarse	.08	@	nom.
Cameta	—	@	.10
Xingu Ball	.10½	@	.11
Tapajos fine, spot	.16½	@	.17
Pontianac			
Prime Pressed	.13	@	.13½
Plantation	—	@	.07½
Bangermassin	.08	@	.08¼
Palembang	.10	@	.10¼
Siak Gutta Percha	.18¾	@	.19
Prime Macassar	2.75	@	2.85
Balata			
Panama Block	.30	@	.40
Surinam Sheets	—	@	.67
Columbia Block	.42	@	.43
Venezuela Block	.54	@	.55

Reclaimed Rubber

NEW YORK, FEBRUARY 11, 1922

Little activity in the reclaimed rubber market is expected until crude rubber prices advance; the fall in these prices during the last few weeks still continues to exert its depressing influence on grades, affecting some more than othrs. Reclaimers report many inquiries, and a few large orders have been placed, but on the whole the market is quiet and prices have changed but little.

Quotations are nominally as follows.

Standard Reclaims			
Floating	$.12	@	$.13
Friction	.12	@	.13
Boots and Shoes	.10	@	.10½
Boots and Shoes (washed)	.13	@	.14
Mechanical	.08	@	.10
Hose	.10½	@	.11½
Tires, truck	.08	@	.09
Tires, auto	.09	@	.10
White	.13	@	.14

Scrap Rubber

NEW YORK, FEBRUARY 11, 1922

Since our last report prices of many grades remain practically unchanged. Dealers are expecting the drop in prices which usually comes at this season of the year due to the surplus of scrap rubber occasioned by the close of the winter months. This influence has already been reflected in the slight drop in the current market price of boots and shoes.

Quotations of this date are nominally as follows:

Auto tire peelings	.01½	@	.01¼
Standard White auto	.01⅞	@	.01¼
Mixed auto	.00¾	@	.00⅞
Bicycle tires	.00½	@	.00⅝
Solid truck tires	.00¾	@	.01
Boots and shoes	.02¾	@	.02⅞
Arctics, trimmed	.02	@	.02¼
Arctics, untrimmed	.02	@	.02½
Inner tubes, No. 1	.03¼	@	.03½
Inner tubes, compounded	.02½	@	.02⅝
Battery jars, black compounded	Nominal		
Battery jars No. 1 bright fracture	Nominal		
Inner tubes, red	.02½	@	.02⅝
Heels and pads	Nominal		
Black mixed	.00¼	@	.00⅜
Garden hose	.00½	@	.00⅝
Air brake hose	.00½	@	.00¾
Red packing	.01	@	.01¼
Red mixed rubber	.01¾	@	.02
White mixed rubber	.01¾	@	.02

AMERICAN RUBBER PATENTS

1,402,947—Derbin S. Myers, Lakemore, Ohio, assignor by mesne assignments to Samuel Johnstone, Buffalo, New York. Tire.

1,403,289—Leo Cartier, Oakland, California. Cushion Tire.

1,403,058—Harold B. Pushee, Akron, Ohio, assignor to the General Tire & Rubber Company, Akron, Ohio. Tire Repair Material.

1,403,085—Charles Jorgensen and George A. Dunmore, Montreal, Canada. Resilient Tire.

1,403,452—George L. Simpson, Santa Ana, Calif. Non-skid Sectional Tire Tread.

1,402,980—John C. Tuttle, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio. Tire-Vulcanizing Apparatus.

1,402,792—Paul Pierce, Chicago, Ill. Bead-pressing and Guide Rolls for Tire Wrapping Machine.

1,403,000—Walter Napoleon, Auclair, Echo, Oreg. Blow-Out Boot for Tires.

1,404,059—William Reid, Robert Harkness Reid and William Reid, Jr., Hamilton, Scotland. Resilient Tire for Wheels.

1,403,691—Howard W. Jordan, Kansas City, Mo., assignor to A. J. Stephens Rubber Co. Inc., Kansas City, Mo. Tire Patch.

1,404,111—Albert E. Gladu, Lynn, Mass. Resilient Tire.

1,404,118—Albert Hargraves, Akron, Ohio, assignor to The Firestone Tire & Rubber Co., Akron, Ohio. Solid-Tire-Regrooving.

Trade Marks Applied For

[The following are trade-mark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Barrister Building, Washington, D. C. or Bush Building, 130 West 42 Street, New York, trade-mark specialists. As an additional service feature to its readers this Journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering.]

LITETREDE—No. 155,081. Bickett Rubber Products Corporation, Watertown, Wis. For Rubber Heels.

S S as monogram—No. 154,620. Spokesfield & Sprenger, Inc., San Francisco, Cal. For Rubber Heels.

TRAVEL TEX—No. 153,022. United States Rubber Company, New Brunswick, N. J., and New York, N. Y. For Brief Cases, Music Rolls, Music Folds, and Collar Bags Made of Imitation Leaher Composed of Rubber and Fabric.

CASCO—No. 147,495. Claudius Ash, Sons & Co., Limited, London, England. For Dental Apparatus and Dental Rubber.

FAIRBANKS in white and letters O. K. in octagonal panel, all on octagonal background—No. 142,209. The Fairbanks Co., New York, N. Y. For Rubber Fabric or Rubber and Fabric Gaskets, and Packing and Rubber and Fabric Washers.

NAUGAHYDE on rim of circle—No. 141,656. United States Rubber Company, New Brunswick, N. J., and New York, N. Y. For Collar Bags Made of Imitation Leather Composed of Rubber and Fabric.

ROGERS—No. 148,219. Detroit White Lead Works, Detroit, Mich. For Medicinal Linseed Oil for Human and Animal Use, Halogenated Oils, Paranitranilin, Pruning Compounds, Wood Preservatives, Rubber Preservatives; Also Dyes, Including Acid-Type, Basic-Type, and Chrome Type Dyes; Coal-Tar Intermediates, Dry Pigment Colors for Use in Dyes, Including Yellows, Greens, Blues, Pulp Colors, Lakes, and Reds; Acetic Acid, Glacial Acetic Acid, Monochromate Liquor, Sodium Acetate.

COVER THE EARTH with picture of paint can bearing initials S W P, spilling paint over the globe, all on rectangular background—No. 137,047. The Sherwin-Williams Company, Cleveland, Ohio. For Rubber Preservatives; also Dyes, including Acid-Type, Basic-Type and Chrome-Type Dyes; Coal-Tar Intermediates; Dry Pigment Colors for Use in Dyes, including Yellows, Greens, Blues, Pulp Colors, Lakes, and Reds; Acetic Acid, Glacial Acetic Acid, Monochromate Liquor for Use in Dyes, and Sodium Acetate.

COVER THE EARTH with picture of paint can bearing initials S W P, spilling paint over the globe, all on rectangular background—No. 137,049. The Sherwin-Williams Company, Cleveland, Ohio. For Tar Compounds and Rubber Compositions for Coating and Cementing Roofs, Concrete and Cement Hardeners, and Sealing Compounds for Pipe Joints and Gaskets.

LIFE SAVER with triangle in center—No. 154,645. Marius Greenspan, Chicago, Ill. For Automobile Rubber Tires.

New Incorporations

NEW YORK

Doscat Tire and Rubber Corporation, to manufacture tires and re-treads. $200,000. Incorporators: H. W. Edwards, Jr., 389 Monroe avenue; W. H. Karnes, 206 Oriole street, H. Wolf, 62 Weaver street—all of Rochester, New York. Principal office, Rochester, New York.

The Shepard Import Co., to import and deal in crude rubber. $60,000. N. C. Shepard, president; X. W. Obalski, vice president and treasurer; T. R. Shepard, secretary. Principal office, 291 Broadway, New York City.

Rubber Metal Horse Footwear Co., Inc., to manufacture horse-shoes of rubber and metal. $1,000,000. Incorporators: F. S. Holmwood, E. C. Wick and W. J. Sutton—all of Buffalo, New York. Principal office, Buffalo, New York.

The Franklin Tire Corporation, to manufacture and sell automobile tires and tubes. $5,000. Incorporators: H. F. Reid, S. Rubin, B. Steineck. Attorneys: Kaplan, Kosman & Streusand, 1540 Broadway, New York City.

Keystone Rubber Heels Corporation, to manufacture and sell rubber heels. $500,000. Incorporators: W. L. Lawrence, K. M. Gore and H. A. Powell. Attorney, S. Silbiger, 375 Fulton street, Brooklyn.

Union Rubber Products Corporation, to manufacture and sell rubber products. $5,000. Incorporators: P. T. Fernold, H. F. Schrader and R. C. Smith. Attorney: P. M. Crandell, 233 Broadway, New York.

R. Ross & Son, to manufacture rubber stamps and stencils. $7,500. Incorporators: R. T. Sherwood, I. V. Gowney, and F. J. McIntyre. Attorneys: Blauvelt & Warren, 61 Broadway.

Whitestone Tire & Rubber Co., to manufacture automobile tires and rubber goods. Principal office, New York City.

Keystone Rubber Heels Corporation, to manufacture rubber heels. $500,000. Incorporators: W. L. Lawrence, K. M. Gove, 53 Concord street, Brooklyn and H. A. Powell, Woodhaven, Long Island. Attorney, S. Silbiger, 375 Fulton street, Brooklyn, New York.

H. Muehlstein & Co., Inc., to deal in crude rubber, etc. $1,360,000. Incorporators: Herman Muehlstein, 41 East 42nd street, New York, New York.

T. A. Desmond & Co., Inc., to deal in rubber and gutta percha goods. $600,000. Incorporator: T. A. Desmond, Montclair, New Jersey. Principal office, New York, New York.

CALIFORNIA

The Hollywood Rubber Co., to manufacture rubber goods. $50,000. Incorporators: E. L. Thompson, J. F. Downey, L. C. Ferguson, S. M. Wilton and T. M. Martine. Principal office, San Francisco, Calif.

CONNECTICUT

The F. L. Mills Co., to manufacture and deal in automobile tires. $150,000. Principal office, Bridgeport, Connecticut.

DELAWARE

The Maguire Tire & Rubber Co., to manufacture and sell automobile tires and tubes. $5,000,000. J. W. Maguire, president; C. Christy, vice president; A. N. Eastman, treasurer and director. Attorney, J. A. Elden, 816 Hippodrome Building, Cleveland, Ohio. Delaware agent, Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware.

R. & M. Auto Co., to manufacture and deal in tires, tubes etc. $200,000. Incorporators: F. R. Hansell and J. V. Pimm of Philadelphia, Pennsylvania; E. M. McFarland, Camden, New Jersey. Delaware agent, Corporation Guarantee and Trust Co., 927 Market street, Wilmington, Delaware.

Johnstone Tire Stores Co., to manufacture tires, tubes, etc. $250,000. Incorporators: Arthur W. Britton, Samuel B. Howard, Robert K. Thistle—all of New York. Agent: United States Corporation Co.

The McDonald Corporation, to manufacture golf balls. Incorporators: A. A. Sheldon, J. Taylor, J. P. McDonald—all of New York, New York. Agent: Delaware Registration Trust Co., Wilmington, Delaware.

Red Circle Rubber Company, to manufacture tubes and tires. $1,000,000. Agent: Corporation Trust Co. of America, Wilmington, Delaware.

FLORIDA

Oakland Sales Co., to deal in tires. $15,000. E. W. Buchanan, president, Orlando; P. J. Hackney, vice president and E. S. Hull, secretary both of Palmetto—all of Florida. Principal office, Tampa, Florida.

INDIANA

Universal Tire and Rubber Company, to manufacture automobile tires. $10,000. Incorporators: C. L. Smith, J. J. Detzler, I. U. Tilman, W. S. Tilman and A. J. Tilman of Michigan City, Indiana. Principal office, Michigan City, Indiana.

The Standard Rubber Cloth Co., to deal in rubberized cloth. $25,000. Incorporators: B. D. Dinsmore, A. W. Waldron, T. M. Robinson. Principal office, Indianapolis, Indiana.

MASSACHUSETTS

Massachusetts Webbing Co., to manufacture and deal in elastic and non elastic webs, etc. $250,000. Incorporators and directors, J. W. Wood, president; J. A. Crummins, treasurer and clerk; H. W. Denison—all of Stoughton, Massachusetts.

Fitchburg Rubber Company, to manufacture rubber goods. $30,000. Incorporators: George I. Crocker, Emerson W. Baker and Edwin C. Thornton of Fitchburg and Fred A. Jenell of Lawrence—all of Massachusetts.

NEW JERSEY

The Trinity Rubber Products Corporation, to manufacture, buy, sell and deal in articles composed wholly or in part of rubber. $25,000. C. H. Dunham, Highland Park; J. E. Westburgh, New Brunswick, E. L. Daniels, South River—all in New Jersey. Principal office, 33 Drift street, New Brunswick, New Jersey. Agent, J. E. Westburgh at 33 Drift street, New Brunswick.

Harvey Manufacturing Co., to manufacture and deal in rubber products. $100,000. E. T. Grewe, Jr.., S. M. Tracey and J. M. Harvey—of 277 Sherman avenue, Newark, New Jersey. Principal office, 277 Sherman avenue, Newark, New Jersey.

OHIO

The Russell Harper Tire Company, to deal in tires. $10,000. Incorporators: Russel E. Harp, Helen B. Harp, B. E. Yoder, Emma McGray Boyer and Dr. F. Walter Boyer—all of Wadsworth, Ohio. Principal office, Wadsworth, Ohio.

Thorobred Rubber Tire Co. $10,000. Incorporators: John A. MacMillan and William H. Hurley, Paul C. Hunter, Herman T. Burchard and Roy Goswell. Principal office, Dayton, Ohio.

Queen City Rubber Co., to deal in rubber goods. $10,000. Incorporators: C. F. Davis, Jr. and Lester A. Joffe. Principal office, Cleveland, Ohio.

OKLAHOMA

Acme Tire Sales Corporation, to deal in tires, accessories and equipment. $20,000. Incorporators: R. V. Hite, J. A. Yeager, L. A. Chipley—all of Oklahoma City, Oklahoma. Principal office, Oklahoma City, Oklahoma.

RHODE ISLAND

Respro Inc., to manufacture and deal in rubber and fiber products. $100,000. Incorporators: E. A. Kingman, W. A. Edwards, K. J. Tanner—all of Providence, Rhode Island. Principal office, Cranston, Rhode Island.

TENNESEE

Tri-State Tire Co., to deal in tires and accessories. $50,000. Incorporators: E. R. and S. B. Blair, L. E. Exum, L. P. Berry, Jr., H. Spears. Principal office, 633 Monroe avenue, Memphis, Tennessee.

TEXAS

The Dayton Rubber Manufacturing Co., of Dayton, Ohio, to do business in Texas. $200,000. Texas state agent, Charles K. Calloway.

WEST VIRGINIA

The Liberty Tire Co., to deal in tires, tubes and automobile accessories. $25,000. G. B. Hervey, president; K. A. Haddad, vice president; H. M. Allen, secretary; G. V. Powell, assistant secretary; L. R. Crago, treasurer. Principal office, 901 Market street, Wheeling, West Virginia.

The Frazier Cushion Cord Tire Co., to manufacture automobile tires. $75,000. Incorporators: Truman Frazier, Jason C. Stamp, John McAleer, M. J. Cullman and Carl O. Schmidt.

Name Change

The William M. Moore Co., to General Tire Co. of Philadelphia, Inc.—Office, Philadelphia, Pennsylvania.